December 1990
16-40004-101

Williams®

HIGH IMPACT FOOTBALL™



HIGH IMPACT FOOTBALL OPERATIONS MANUAL

* Game Operation & Adjustments
* Game Testing & Problem Diagnosis
* Parts Information
* Reference Diagrams & Schematics

WILLIAMS ELECTRONICS GAMES, INC.
3401 N. CALIFORNIA AVE.
CHICAGO, IL 60618

HIGH IMPACT FOOTBALL!

Experience the earnings impact of Williams' HIGH IMPACT FOOTBALL, and discover why sports video will never be the same again! Only HIGH IMPACT breaks new ground with LIVE ACTION football that delivers all the bone-crunching tackles, circus catches and high energy gridiron excitement.

HIGH IMPACT brings football to life with the energy and strategy of a non-stop highlight film. The reason is Williams' own exclusive digitized graphics technology for on-screen football action that's so real players will feel like suiting up!

With 15 Pro-Action teams to choose from, HIGH IMPACT packs scoring power and continuous buy-in profit punch for 1 to 4 players. There's easy-to-use single "Move" joystick and "Action" button *Superstar™* Controls, with over 40 authentic Offensive plays and Defensive formations to choose from.

This is the single football game you've been waiting for! Players will test their skills to master long-range Bombs, Double Reverses, Half-back Options, Nickel Defense, Zone Coverage, Stunts, Red-Dog Blitz and so much more.

HIGH IMPACT brings you all the action on and off the field - the cheerleaders, the coaches, the outrageous banter of Manic Max™ the deranged play-by-play commentator, the hot dog antics of the players and the cheers and jeers of the fans led by Joe Six-Pack™.

Game Rules:

1 Player on a team: You are Quarterback and Defensive Captain.
2 Players on a team: Players 2 & 3 are Quarterbacks.
Players 1 & 4 are Defensive Captains.
START/BUYIN: Insert coin(s) and hit START button for each coin.

OFFENSE

PASS: Point Joystick to receiver, hit Action button.
Handoff: Point Joystick to halfback, hit Action button.
Spin Move: Hit Action button & move Joystick up or down.
Jump Move: Hit Action button & move Joystick right or left.
Kick: Tap Action button rapidly to increase distance.

DEFENSE

Select Player To Control: Hit Action button before hike.
Turbo Speed: Hold down Action button for Awesome Speed Burst.
Killer Tackle: Hit Action button.
Interception: Hit Action button for leaping catch.
Block Kick: Hit Action button.

TABLE OF CONTENTS

Section 1 Operation and Troubleshooting

Section 2 Parts Information

Section 3 Diagrams and Schematics

NOTES:

HIGH IMPACT FOOTBALL

SECTION

one

Operation and Troubleshooting

Safety Notices

The following safety hints apply to all game operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply. We recommend that you read this page, and also all of Section 1, before preparing your game for play.

WARNINGS

AC POWER CONNECTION. Before connecting the game to the AC power source, verify that the "line voltage selection chart" jumper wires are installed correctly for the line voltage in your area. For details, refer to Section 3.

PROPERLY GROUND THE GAME. To avoid electrical shocks, do not plug in the game until it has been inspected and properly grounded. WILLIAMS games should only be plugged into a grounded 3-wire outlet. Shocks will also result, if the control panel is not properly grounded! After servicing any parts on the panel, assure that the ground wires are secure. Only then should you lock up the game.

DISCONNECT POWER DURING REPAIRS. To avoid electrical shock, disconnect the game from the AC power source before removing or repairing any part of the game. When removing or repairing the monitor, extra precautions must be taken to avoid electrical shock because high voltages may exist within the monitor circuitry and cathode ray tube (crt) even after power has been disconnected. Do not touch internal parts of the display with your hands or metal objects! Always discharge the crt: attach one end of a large, well-insulated, 20-kV jumper to ground. Momentarily touch the free end of the grounded jumper to the anode by sliding it under the anode cap. Wait two minutes and discharge the anode again.

USE THE PROPER FUSE. To avoid electrical shock, use the replacement fuse which is specified in the parts list for this game. The replacement fuse must match the original fuse in fuse type, voltage rating, and current rating.

HANDLE FLUORESCENT TUBE AND CRT WITH CARE. If you drop a fluorescent tube or CRT and it breaks, it will implode! Shattered glass can fly eight feet or more from the implosion.

CAUTION

PROPERLY ATTACH ALL CONNECTORS. *Make sure that the connectors on each printed circuit board (pcb) are properly connected. If they do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. All connectors are keyed to fit specific pins on each board.*

Setup Procedure

Installation and Inspection

1. Remove the game from its shipping carton, and inspect the exterior of the cabinet for any signs of damage. Remove the shipping cleats from the bottom of the cabinet.

2. Remove keys from the taped coin return slot (or attached to joystick). Unlock and open the coin and cash box doors. (Leg levellers and spare parts are stored in the cash box.)

3. Locate the four threaded holes on the bottom of the cabinet (one in each corner),and install one leg leveller (with its hex nut) in each hole.

4. Stand the cabinet upright and make certain that it is in a stable position. Level the cabinet.

5. Unscrew (or unlock) and remove the rear doors/panels of the cabinet. Inspect the interior for any signs of damage. Check all major assemblies to assure that they are mounted securely.

6. Refer to the game's cabinet wiring diagram (Section 3), and check to see that all cable connectors are correctly secured and firmly seated. DO NOT FORCE CONNECTORS. Watch for damaged connectors and avoid making reversed connections.

7. Line Voltage Selection. Your game is designed to work properly on the line voltage where you are located. Determine the value of your line voltage with a meter. Then, check the power input wires to the main power supply transformer on your game to be sure they are connected to taps which correspond to your local line voltage value. If necessary, reconnect the power input wires to the transformer in accordance with the Tranformer Chart in Secton 3.

If the line voltage in your area falls outside the upper or lower limits of the range of voltage inputs covered by the main powe supply transformer, DO NOT PLUG YOUR GAME IN until you have contacted your distributor or the WILLIAMS Service Department and obtained a solution to the problem. Otherwise, you could damage your game.

8. Lay the line cord (connected to the Power Chassis) in the slot along the bottom edge of the lower rear cabinet door/panel. Install the rear cabinet doors/panels and screw (lock) them securely. Close and lock the front coin and cash box doors.

9. Connect the line cord to a grounded (3-terminal) AC wall outlet.

10. Switch ON the game, using the ON/OFF switch located on the upper left rear of the cabinet, to verify proper operation.

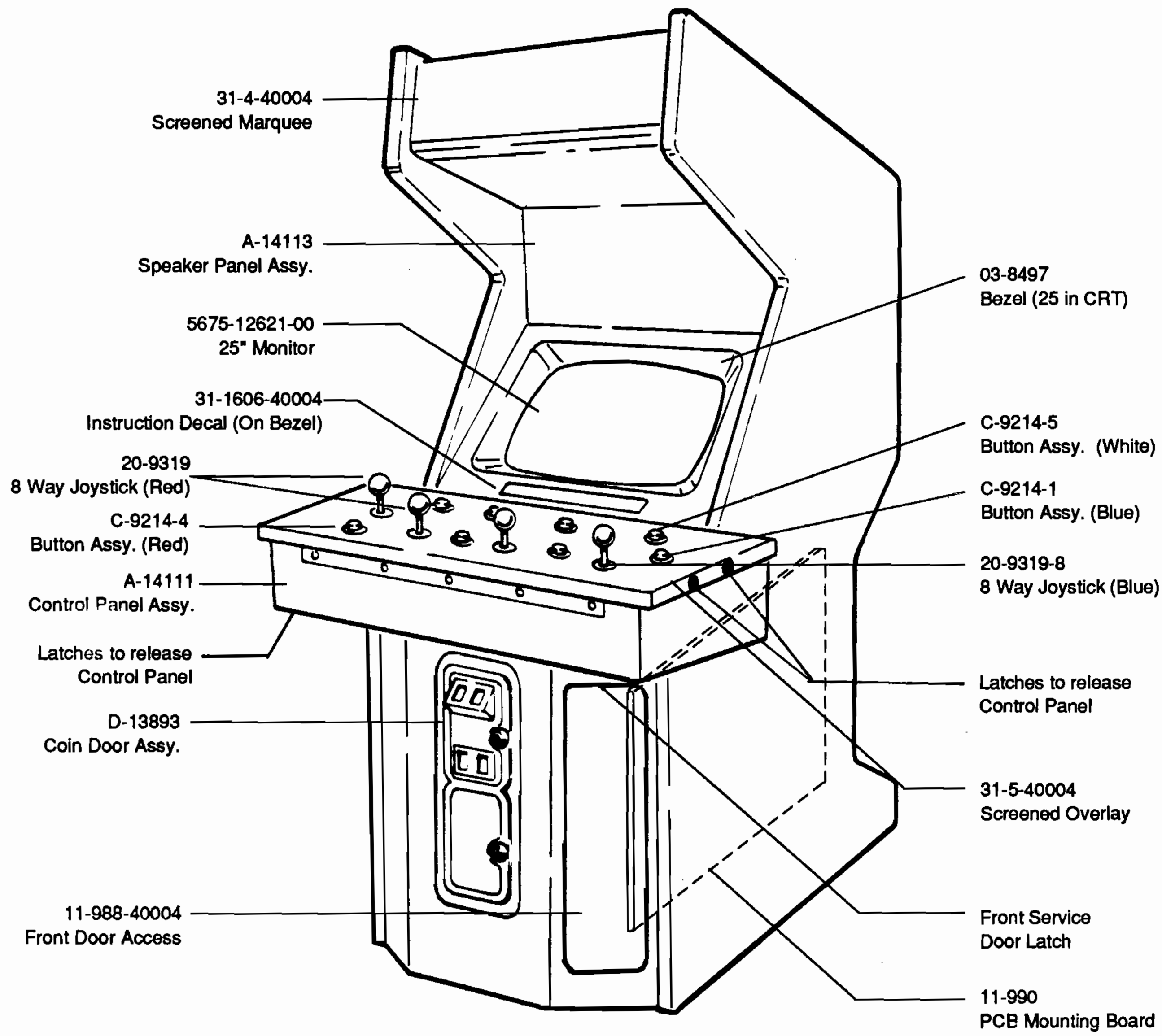
GAME LOCATION REQUIREMENTS

<u>Power</u>
Domestic 115V @ 60 Hz
Foreign 230V @ 50 Hz

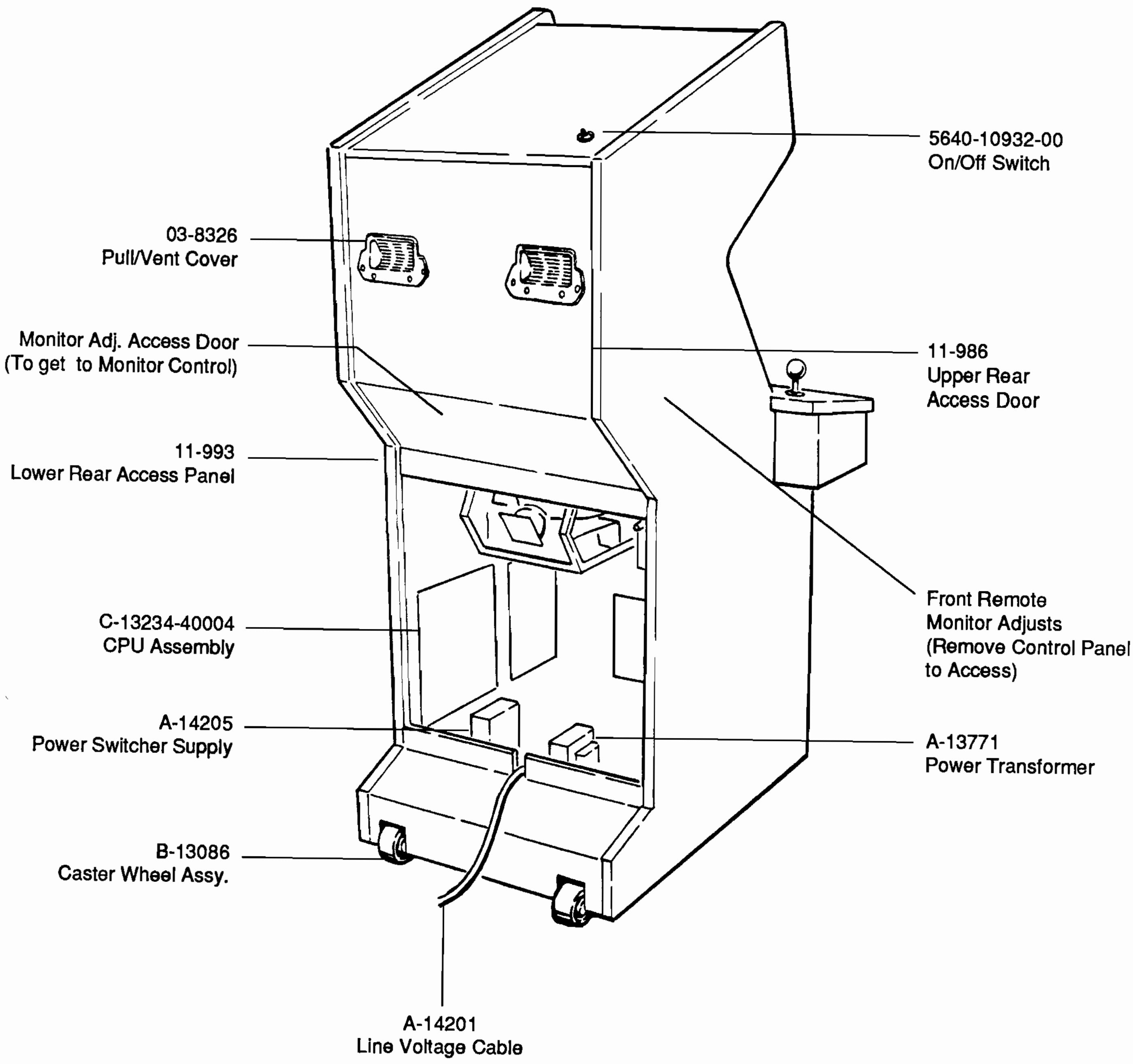
<u>Temp.</u>
32° F to 100° F
(0° C to 38° C)

<u>Humidity</u>
Not to exceed 95% relative.

HIGH IMPACT FOOTBALL Assembly
(Front View)



HIGH IMPACT FOOTBALL **Assembly**
(Rear View)



Servicing

Servicing the Control Panel

Switch OFF power to the game. The control panel is held in place by two latches (located on the left and right sides of the cabinet) which provide constant pressure on the strikes. The latches can be reached through the coin door opening. To release the latches, lift the latch handle and unhook the wire fasteners. Carefully use the joysticks to lift the control panel. Tilt the control panel back while working on it. To reinstall the control panel, check for proper cable connections, including the ground strap, and use the joysticks to lower it into position, avoiding pinched wires. Reclamp the latches.

Removal of Viewing Glass

Switch off power to the game, and open the control panel. Carefully lift the glass from its bottom groove and lift it clear of the cabinet.

Removal of Monitor Bezel

Switch off power to the game, and remove the viewing glass. Remove the bezel securing screws to free the monitor bezel.

Monitor Replacement

We recommend that you read the WARNINGS section thoroughly before beginning this procedure.

Switch off power to the game. Open the upper rear door/panel. Remove the viewing glass and the monitor bezel. Completely disconnect the monitor from all of its cabling, including its chassis ground strap. Remove the four bolts securing the monitor's mounting flanges to its mounting panel. Pull the monitor carefully from the cabinetfront.

CAUTION

The monitor DOES NOT contain an isolation transformer in its chassis (it is mounted instead in the Power Chassis Assembly located on the floor of the cabinet). When servicing the monitor on a test bench, YOU MUST ISOLATE THE MONITOR FROM THE LINE VOLTAGE WITH AN ISOLATION TRANSFORMER.

CAUTION

While removing the four bolts, firmly support the monitor from the front of the crt so that it will not slip.

WARNING

If you drop a fluorescent tube and it breaks, it will implode! Use care in handling.

Removal of the Marquee Glass

Switch off power to the game. Remove the screws in the black plastic strip on top of the cabinet. Remove the strip and carefully lift the glass. Store the glass carefully to prevent damage.

The fluorescent tube is now accessible for replacement. Grasp the tube, give it a quarter turn, and remove it from its socket. Carefully place a new tube into the socket, and turn to reinstall.

Removal of the Fluorescent Light Assembly

Switch off power to the game. Remove the marquee glass. Disconnect the fluorescent light assembly from its power cable. Remove the screws fastening the assembly to the cabinet and lift out the assembly.

Removal of the Speakers

Switch off power to the game. Remove the upper rear cabinet door/panel, taking care to *not* damage the speaker enclosure seals. Disconnect the speakers from their cabling. Remove the nuts on the speaker mounting bolts. Remove the speakers. Because the speakers are mounted in an acoustical enclosure, carefully reinstall the seals upon completing any task in the speaker enclosure.

Volume Control, Test/Diagnostics Switch, and Service Credit Switch

Open the coin door to locate the game's volume control and Diagnostic switches on the small panel atop the cash box cover. The Volume Control is the white knob on left end of the panel. Turning the knob clockwise increases the volume. The upper right switch on the bracket is the Test/Diagnostics Switch that enables activating the game's test mode. The lower right switch is the Service Credit Switch, which allows adding credits to a game for service testing without affecting the game's bookkeeping total.

Game Features

Starting Up

Switch on power to the game. A "rug" pattern appears on the crt screen. When the "rug" pattern ends, the screen shows CHECKING SCRATCH RAMS, and then CHECKING ROMS. The next screen shows HIGH IMPACT FOOTBALL REVISION LEVEL, CMOS TEST OK and the COIN SETTING. The game then moves to the attract mode. After the proper coinage has been inserted, the game exits the attract mode and enters the play mode.

HIGH IMPACT FOOTBALL IS A 1 TO 4 PLAYER GAME.

NOTE

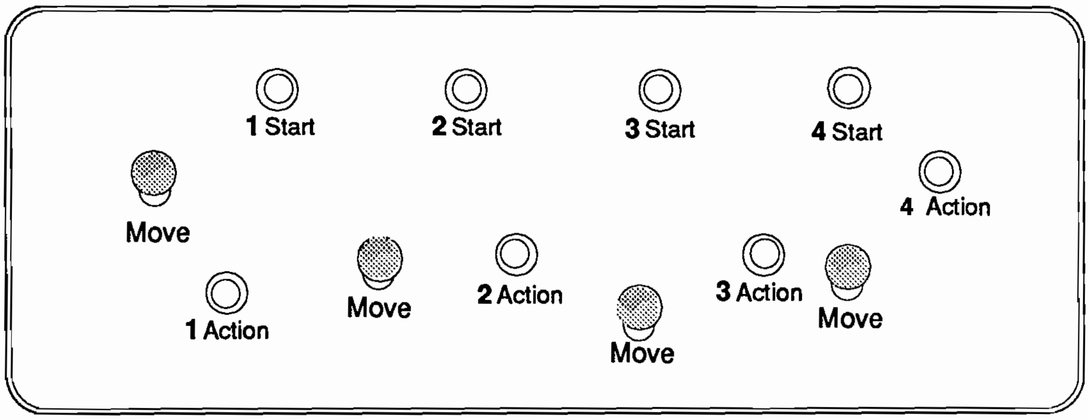
HIGH IMPACT FOOTBALL will operate in the Test Mode, when the Test Switch (on the cash box cover) is closed *or* DIP Switch Bank #2 Switch #8 is closed.

When an error is detected during Start-up Tests, game start-up does not progress, and an error message appears on the screen.

Player Controls

- Each Start button allows (1 to 4) players to begin play or continue play.
- 1 Action button per player.
- 1 Joystick (Move) per player.

HIGH IMPACT FOOTBALL
Control Panel

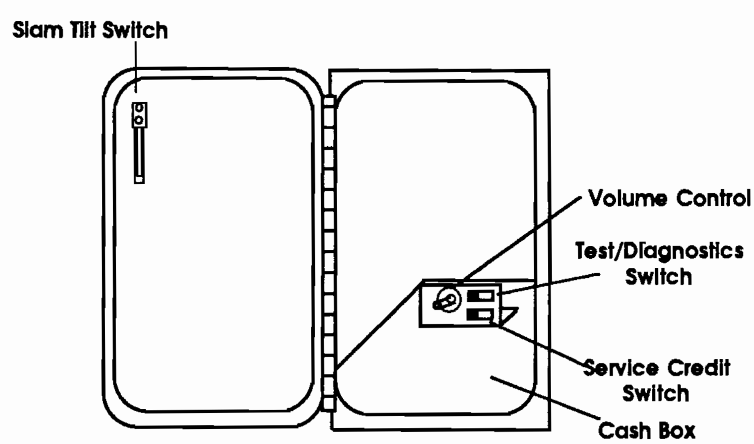


Game Operation

HIGH IMPACT FOOTBALL is a one to four player video game with a color monitor. From the player's perspective, the game has two modes of operation: Ready-to-Play and Play. For the owner/operator, the game has an additional mode of operation called Game Diagnostics and Adjustments.

Control Switches

- The **COIN DOOR SLAM TILT SWITCH** detects any forceful vibrations against the Coin Door. This eliminates pounding for free games.
- The **VOLUME CONTROL** allows increasing or decreasing the volume level of the game music and speech. For greater profits, set your game's volume level at its maximum.
- The **TEST/DIAGNOSTICS SWITCH** allows you to enter into the game's Diagnostic mode. Move the Test Switch to enter the Diagnostics Mode. To exit this mode, select EXIT TO GAME OVER from the Diagnostics main menu.
- The **SERVICE CREDIT SWITCH** is a special feature switch that allots credit without affecting the game's bookkeeping total.



Control Switch Locations

Game Audits, Adjustments & Diagnostics

Operation

All HIGH IMPACT FOOTBALL Game Audits, Adjustments, and Diagnostics are options of the Main Test Menu. Each option, in turn, has its own menu, listing several choices that you may act upon as desired.

Move the Test Switch (on the cashbox lid panel) to activate the HIGH IMPACT FOOTBALL Adjustments and Diagnostics. Main Test Menu (shown below) then appears. Game adjustments, bookkeeping, and diagnostics are all accessible from this menu.

Move any joystick up or down to cycle through the menu options. Notice that the options are highlighted in sequence. Selecting a desired option requires it to be highlighted. To activate the selected option, press any button.

The Main Test Menu lists six options.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

DIAGNOSTIC TESTS

COIN BOOKKEEPING

GAME AUDITS

GAME ADJUSTMENT

UTILITIES

EXIT TO GAME OVER

Main Test Menu

DIAGNOSTIC TESTS

To enter the Diagnostic Tests from the Main Test Menu, move any joystick to select (highlight) the Diagnostic Test option, and press any button to activate the option.
The Diagnostic Tests Menu lists seven options.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

SWITCH TEST
DIP SWITCH TEST
CPU BOARD TEST
SOUND BOARD TEST
MONITOR PATTERNS
BURN-IN TEST
RETURN TO MAIN MENU

Diagnostic Test Menu

Switch Test

The Switch Test allows the operator to test the switches on the control panel and the coin door.

Select the Switch Test by using any joystick to highlight the Switch Test option; then, press any button to activate it. The top of the screen shows a layout of the control panel and the bottom of the screen lists the coin door switches. Pressing a switch causes the corresponding switch location on the screen to light. Release the switch and the screen returns to normal.

Select the RETURN TO MAIN MENU option to return to the Diagnostic Test Menu.

DIP Switch Test

The DIP Switch Test allows the operator to check the position of the two 8-position DIP switches on the CPU Board. The operator can also change the setting of each position of each DIP switch during this mode.

Select the DIP Switch Test by moving any joystick to highlight the DIP Switch Test option; then, press any control panel button to activate the test. The screen displays a layout of the DIP switches and their current settings.

To change the setting of either DIP switch, press the switch position (SW1 - SW8) to the desired setting (ON from OFF, or vice versa). Check the screen to verify that the switch now shows the setting desired.

Press any control panel button to return to the Diagnostic Test Menu.

DIP Switch 1 Settings Table

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
4 Player	Off *							
2 Player	On							
CMOS Coinage		On						
DIP Switch Coinage		Off *						
Coin Settings								
USA 1 / Ger 1 / Fr 1			Off *	Off *	Off *			
USA 2 / Ger 2 / Fr 2			On	Off	Off			
USA 3 / Ger 3 / Fr 3			Off	On	Off			
USA 4 / Ger 4 / Fr 4			On	On	Off			
USA ECA / Ger ECA / Fr ECA			Off	Off	On			
N/U / N/U / N/U			On	Off	On			
N/U / N/U / N/U			Off	On	On			
Free Play / Free Play / Free Play			On	On	On			
Not Used						Off *	Off *	Off *

DIP Switch 2 Settings Table

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
USA	Off *	Off *						
German	On	Off						
French	Off	On						
Not Used	On	On						
Not Used			Off *					
One Counter				Off *				
Two Counters				On				
Not Used								
Not Used								
Test Switch								
Game Mode								Off *
Test Mode								On

* Indicates Factory Setting

CPU Board Test

The CPU Board Test (much like the Start-up Test) allows the operator to check the RAMs and ROMs.

NOTE

As soon as a faulty chip is detected, the CPU Test stops. The remaining chips are not tested.

Select the CPU Board Test with any stick; then, press any button to activate the automatic test of the CPU Board's RAMs and ROMs. When this test is activated, a "rug'" pattern appears on the screen. The screen then changes to show the layout of the RAMs, and ROMs on the CPU. Any chip that is shown as black with a white outline is part of the CPU and should turn either red or green during the CPU Test. Any chip that is shown as gray with a white outline is not installed in the game. During the test, chips are good, if they turn green; they are faulty, if they turn red.

Sound Board Test

The Sound Test allows listening to some of the sounds that HIGH IMPACT FOOTBALL is capable of producing. This test also emits a tone for each fault that is detected.

Select the Sound Board Test with any stick; then, press any button to activate the test. The screen displays two test options:

GENERAL TEST analyzes the sound circuitry. A successful test causes a single "tone" to sound. Detection of a fault causes a series of tones to sound. When no tone sounds, this also indicates a Sound Board problem.

PLAY SOUNDS tests synthesized & digitized sounds from the Sound Board. Advance to the next sound by moving any stick, and press any button to return to the Sound Test Menu.

GENERAL TEST

PLAY SOUNDS

BACK TO DIAGNOSTICS MENU

RETURN TO MAIN MENU

Sound Test Menu

Monitor Patterns

The Monitor Patterns Test provides a menu for testing the monitor.

Move any stick to select a test; press any button to activate the test.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

RED SCREEN
GREEN SCREEN
BLUE SCREEN
COLOR BARS
CROSSHATCH PATTERNS
BACK TO DIAGNOSTICS MENU
RETURN TO MAIN MENU

Monitor Pattern Menu

The **RED, GREEN**, and **BLUE SCREEN** tests fill the screen with either red, green or blue.
The **COLOR BARS** test fills the screen with several gradiated colors to help with red, green and, blue level adjustments. Each color should appear sharp and clear.
The **CROSSHATCH PATTERNS** test fills the screen with a grid and a series of dots. The grid and the dots should be clear. The dots should appear round.

If any of the Monitor Pattern Tests shows a need for adjustment, use the proper white knobs on the Monitor Board.

Select Monitor Patterns Menu with any stick, and press any button to activate. From this menu, select RETURN TO MAIN MENU with any stick and activate with any button.

Burn-in Test

The Burn-in Test continually repeats the CPU Board Test. Move any any stick to select the Burn-in Test; then, press any button to activate the test. When the Burn-in Test detects an error, the test stops and displays an error message on the screen. The fourth page of the Audit Table specifies the number of Burn-in cycles successfully completed. Use this test to find intermittent CPU problems.

To exit this test, switch off the game; then, switch it on again.

COIN BOOKKEEPING

To enter the Coin Bookkeeping from the Main Test Menu, move any stick to select the Coin Bookkeeping option; then, press any button to activate it.

The Coin Bookkeeping Table records the coinbox totals and game play counters. The left side of the table names the bookkeeping item; the right side shows the number of coins, credits, or plays for each item.

LEFT SLOT COINS	0
RIGHT SLOT COINS	0
THIRD SLOT COINS	0
FOURTH SLOT COINS	0
SERVICE CREDITS	0
PAID CREDITS	0
TOTAL PLAYS	0
PLAYS UNTIL HIGH SCORE RESET	5000

MORE DETAILED DATA
RETURN TO MAIN MENU

Coin Bookkeeping Table

To exit Coin Bookkeeping, move any stick to select RETURN TO MAIN MENU; then, press any button to activate it.

LEFT SLOT COINS	0
RIGHT SLOT COINS	0
THIRD SLOT COINS	0
FOURTH SLOT COINS	0
TOTAL COLLECTIONS	0

CLEAR COIN METERS
RETURN TO MAIN MENU

Total Collection Table

GAME AUDITS

To enter Game Audits from the Main Test Menu, move any stick to select the Game Audits option; then, press any button to activate it. To advance to the next (or return to the previous) page of the Game Audit Table, move any joystick to select either "Next Audit Page", or "Previous Audit Page"; then, press any control panel button to change the page.

The Game Audits Table records the game play statistics. The left side of the table names the Audit item; the right side shows the amount of play.

TOTAL GAME UPTIME	0
TOTAL PLAY TIME	0
TIME 1 PLAYER ONLY	0
TIME 2 PLAYER SIMULTANEOUS	0
TIME 3 PLAYER SIMULTANEOUS	0
TIME 4 PLAYER SIMULTANEOUS	0

NEXT AUDIT PAGE
RETURN TO MAIN MENU

PAGE 1 OF AUDIT TABLE

TOTAL PLAYS	0
1 PLAYER GAME STARTS	0
2 PLAYER GAME STARTS	0
3 PLAYER GAME STARTS	0
4 PLAYER GAME STARTS	0
CONTINUES OFERED	0
CONTINUES TAKEN	0
CONTINUES REFUSED	0
GAMES PLAYED TO COMPLETION	0

NEXT AUDIT PAGE
PREVIOUS AUDIT PAGE
RETURN TO MAIN MENU

PAGE 2 OF AUDIT TABLE

GAME AUDITS CONTINUED

LEFT TEAM TOUCHDOWNS	0
RIGHT TEAM TOUCHDOWNS	0
PASSES ATTEMPTED	0
PASSES COMPLETED	0
SAFTIES	0
HUMAN FIELD GOAL ATTEMPTS	0
HUMAN FIELD GOAL COMPLETIONS	0
HUMAN EXTRA POINT ATTEMPTS	0
HUMAN EXTRA POINT COMPLETIONS	0

NEXT AUDIT PAGE
PREVIOUS AUDIT PAGE
RETURN TO MAIN MENU

PAGE 3 OF AUDIT TABLE

HUMAN INTERCEPTIONS	0
DRONE INTERCEPTIONS	0
BURN-IN CYCLES SUCCESSFULLY COMPLETED	0

PREVIOUS AUDIT PAGE
RETURN TO MAIN MENU

PAGE 4 OF AUDIT TABLE

To exit the Game Audit Table , move any stick to select RETURN TO MAIN MENU; then, press any button to activate it.

GAME ADJUSTMENTS

Move any joystick to select the Game Adjustment option on the Main Test Menu; then, press any button to activate it.

The Game Adjustments option allows the owner/operator to change the Game Pricing and Game Difficulty.

The Game Adjustment Menu offers several choices. Each choice has its own menu. Move the left joystick to select your choice to be changed from the Game Adjustments Menu; then, move right joystick to activate that choice. On the next menu screen, move the left joystick to select the item you wish to modify; then, move the right to activate that item. If the activated item only provides a setting choice, move any joystick to change the current setting to the desired value; then, press any button to lock in the desired value. Moving the joystick up increases the setting value shown on the screen. Moving the joystick down causes the value shown on the screen to decrease.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

RETURN TO MAIN MENU

CREDIT TIMER

ATTRACT MODE SOUNDS

GAME CLOCK SPEED

STANDARD PRICING

CUSTOM PRICING

GAME DIFFICULTY

FREE PLAY

RETURN TO MAIN MENU

Game Adjustment Menu

Note, Game Adjustments are explained in more detail on the following page.

Credit Timer
Controls the speed of the player credit timer. The settings for the adjustment are:
- Slow
- Medium (factory)
- Fast

Attract Mode Sounds
Determines whether the game will make sounds in the attract mode. The settings for the adjustment are:
- Yes (factory)
- No

Game Clock Speed
Allows the operator to adjutst the speed at which the game clock will countdown. The settings for the adjustment are:
- Slow
- Medium (factory)
- Fast

Standard Pricing
Standard Pricing allows the operator to choose any of the "Standard" selections for the Standard Pricing Table.

Custom Pricing
Custom Pricing allows the operator to install pricing other than that of the Standard Pricing Table. Custom Pricing also allows the operator to select the maximum amount of credits per game, the amount of credits required to start a game, and the amount or credits required to continue a game. This option is being adjusted from the Dip Switch Settings.

Game Difficulty
Game Difficulty allows the operator to select the difficulty level of the game. The settings for the adjustment are:
- Easy
- Medium (factory)
- Hard

Free Play
This option allows the operator to select free play. The settings for the adjustment are:
- No (factory)
- Yes

HIGH IMPACT FOOTBALL Standard Pricing Table

NAME	SETTING Credit/Coin	LEFT CHUTE	CENTER CHUTE	RIGHT CHUTE	FOURTH CHUTE
USA 1	1/25¢	25¢		25¢	
USA 2	1/50¢	25¢		25¢	
USA 3	1/50¢, 3/$1.00	25¢		25¢	
USA 4	1/50¢, 4/$1.00	25¢		25¢	
USA ECA	1/25¢, 4/$1.00	$ 1.00	10¢	25¢	5¢
German 1	1/1 DM, 6/5 DM	1 DM		5 DM	
German 2	1/1 DM, 7/5 DM	1 DM		5 DM	
German 3	1/1 DM, 8/5 DM	1 DM		5 DM	
German 4	1/1 DM, 5/5 DM	1 DM		5 DM	
German ECA	1/1 DM, 2/2 DM, 6/5 DM	5DM	1DM	2DM	
France 1	2/5 F, 5/10 F	5 F		10 F	
France 2	2/5 F, 4/10 F	5 F		10 F	
France 3	1/5 F, 3/10 F	5 F		10 F	
France 4	1/5 F, 2/10 F	5 F		10 F	
France ECA	1/3 X 1 F, 2/5 F, 5/2 X 5 F	1F	10F	5F	
Swiss	1/1 F, 6/5 F	1 F		5 F	
Italy	1/500 Lire	500 Lire		500 Lire	
UK 1	1/20 P, 3/50 P	20 P		50 P	
UK ECA	1/30 P, 2/50 P, 4/£1.00	£1.00	20P	50 P	10 P
Spain 1	1/25 Peseta, 5/100 Peseta	25 Peseta		100 Peseta	
Japan 1	1/100 Yen	100 Yen		100 Yen	

If option desired is not shown above, use custom pricing .

GAME ADJUSTMENTS CONTINUED
CUSTOM PRICING

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

(1) LEFT CHUTE UNITS

(1) RIGHT CHUTE UNITS

(1) THIRD CHUTE UNITS

(1) FOURTH CHUTE UNITS

(2) UNITS/CREDIT

(3) UNITS/BONUS

(4) MINIMUM UNITS REQUIRED

(5) CREDITS TO START

(6) CREDITS TO CONTINUE

(7) COINS PER DOLLAR

MAXIMUM CREDITS

RETURN TO ADJ. MENU

(1) Coins inserted accumulate units. This adjustment specifies the number of units given for each coin in the fourth chute (see "units/credit").

(2) This is the number of coin units required to buy one credit.

(3) One bonus credit is awarded after this many coin units have accumulated.

(4) No credits will be awarded until this many coin units have accumulated.

(5) Each player needs this many credits to begin a game.

(6) Each player needs this many credits to continue a game.

(7) The detailed bookkeeping screen shows total collections based on this many coins per dollar. (Set to zero to disable the display of money totals)

(8) This is the limit for the credits counter. Additional coins inserted will be lost. (factory setting: 30)

UTILITIES

On the MainTest Menu, move any joystick to select the Utilities option; then, press any control panel button to activate it.

The Utilities option allows the owner/operator to clear the game's bookkeeping memory and to install a custom message.

SELECT WITH ANY STICK
ACTIVATE WITH ANY BUTTON

SET OPERATOR MESSAGE

CLEAR CREDITS

CLEAR COIN COUNTERS

CLEAR GAME AUDITS

RESET HIGH SCORE

DEFAULT ADJUSTMENTS

FULL FACTORY RESTORE

RETURN TO MAIN MENU

Utilities Menu

Move any joystick to select an item from the Utilities Menu; then, press any control panel button to activate that item. After an item has been activated, you are given the option of resetting the item or not. For example;

CLEAR CREDITS
ARE YOU SURE ?

YES
NO

Move any joystick to choose YES or NO; then, press any control panel button to lock in your choice and to return to the Utilities Menu.

To exit Utilities, move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate it.

Troubleshooting

Problem	Possible Solution
NO PICTURE OR DISTORTED PICTURE.	Check for faulty video board or monitor. Check for disconnected video signal cable.
TURN GAME ON & NOTHING HAPPENS	Check line fuse. Check for +5V dc at pins C, D, 3, and 4 of the JAMMA Connector.
NO SOUND	Check the speaker and speaker connection to pins L and 10 on JAMMA Connector. Check volume control setting. Check for +12V dc at pins F and 6 on the JAMMA Connector. Check interboard wiring from CPU Board to Sound Board.
NO GENERAL ILLUMINATION	Check the 1 A., S-B fuse on the the bottom of the cabinet below the coin box.
MOVE JOYSTICK, BUT PLAYER DOES NOT MOVE	Check for open wires between Joystick and CPU Board. Check for contamination on joystick switch contacts and CPU Board pins. Check for proper ground.
PRESS **START** or **ACTION BUTTON** AND NOTHING HAPPENS	Check for open wires between button and CPU Board. Check for contamination on CPU Board pins or button switch blade contacts. Check for proper ground.
NO CREDIT GIVEN WHEN COINS ARE INSERTED	Check DIP switch coin setting. Check for contamination on coin switch contacts. Check for an open wire between Coin Switch 1 and pin 16 on JAMMA Connector or Coin Switch 2 and pin T of JAMMA Connector.
TOO MANY CREDITS FOR NUMBER OF COINS INSERTED	Check Game Pricing setting. Check for a short between pins T & 16 on JAMMA Connector.
GAME STAYS IN THE TEST MODE.	Check that the Test Switch (if you have Installed one) and the Test Switch (Position 8) on DIP Switch 2 are set to OFF.

NOTES:

HIGH IMPACT FOOTBALL

SECTION
two

Parts Information

Cabinet Hardware

Cabinet Assembly	A-13768-40004
Caster Wheel Assembly	B-13086
Front Door Assembly	A-14114
Leg Leveler Plate	01-9155
Leg Adjuster	08-7377
Wood Cabinet	11-947
Back Door Assembly	B-13574
Lock Retainer	01-7264
Upper Door Cam Lock	01-8989
Rear Wood Door	11-934-
Door Cam Lock	20-6542-TB
Line Voltage Cable Assembly	A-14201
Mtg Plt Toggle Assembly	A-9958
Line Voltage Cable	H-14235
Protective Cap	17-1038-2
Toggle Switch, 227V,15A.	5640-10932-00
Over/Under Coin Door	D-13893
Test Switch	A-13115
Coin Door Cable	H-13842
Coin Door USA	09-20000-V-1
12 pin "Z" Header	5791-12235-12
Speaker Grille	01-9910
Glass Retainer Bracket	01-9607
Marquee Retainer	03-8252-2
Lock Lamp	03-8327
Glass Edge Channel	03-8358
Back Door, Top	11-918-2
Back Door, Bottom	11-918-3
Toggle Latch	20-9347
HIGH IMPACT Marquee	31-4-40004

Speakers

Piezo Speaker Assembly	A-14113
4" Piezo Speaker, 50W	5555-12068-00
6" Round Speaker, 8ohm, 20W	5555-12015-00

Fluorescent Lamp Parts

Fluorescent Housing & Bracket	C-12679
Housing Mounting Brkt	01-9146
Light Fixture	20-9590
18" Fluorescent Bulb, 15 W	24-8809

PC Boards

Y-Unit CPU Assembly	C-13234-40004
Power Supply Assembly	A-14205
Audio Sound Board Assembly	A-13971-40004

Transformer Assembly

Power Pack Assembly	D-13252
Line Cord Assembly	A-13340
Power Transformer Assembly	A-13371
Power Transformer	5610-12559-00
Power Pack Chassi Assy	C-13251
Power Pack Jumper Cable	H-13265
Line Filter Jumper Cable	H-13344
Transformer Jumper Cable	H-13378
Varistor, 130V, 10J	5017-09044-00
Line Filter, 5Amp	5102-08895-00
Fuse, SB3A, 125V	5731-08633-00
Fuse Holder, Panel	5733-10358-00

Control Panel

Control Panel Assembly	A-14111
Control Plate & Stud Assy.	A-14112
Blue Button Assembly	C-9214-1
Red Button Assembly	C-9214-4
White Button Assembly	C-9214-5
Control Panel Bracket	01-9651
5/8 Palnut	20-9222
Red Joystick	20-9319
Blue Joystick	20-9319-8
Screened Overlay	31-5-40004

Monitor

Monitor 25"	5675-12621-00

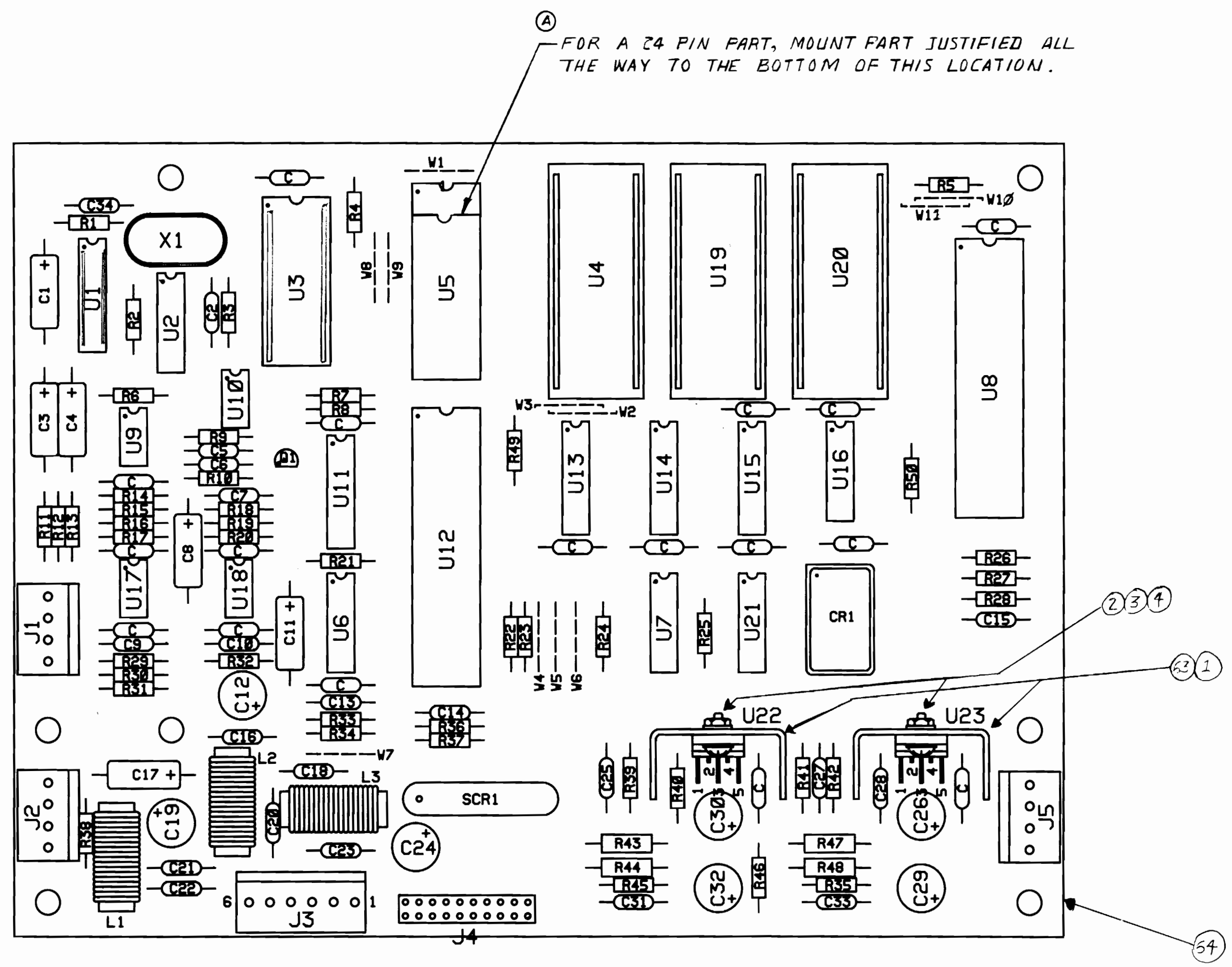
Cables

Video Sound/Power Cable	H-10217-4
Sound/ Power Speaker Cable	H-13257
Volume Control Cable	H-13258
Power Pack Jumper Cable	H-13265
Line Filter Jumper Cable	H-13344
Transformer Jumper Cable	H-13378
Coin Door Cable	H-13842
Speaker Cable	H-14202
Main Harness Cable	H-14233
Control Panel Cable	H-14234
Line Voltage Cable	H-14235
20 pin Ribbon Cable	5795-10937-06

Manuals

Monitor Manual	16-3000-103
Instruction Manual	16-40004-101

REV	DESCRIPTION OF CHANGE	ECN NO DATE
	NDR 8-27-90	24725
A	ADDED 24 PIN RAM INFO. ALSO SEE SHEET 2. 9-6-90	24897 9-17-90



AUDIO BOARD ASSEMBLY
A-13971-40004

Item	Part Number	Designation	Description
1	20-9229		Thermal Compound
2	4006-01113-06		#6-32 x 3/8 P-PH-S
3	4406-01128-00		#6-32 Hex Nut
4			
5	5010-08772-00	R18	RES. 15K 1/4 W 5%
6	5010-08824-00	R32	RES. 43K 1/4 W 5%
7	5010-08846-00	R31	RES. 220K 1/4 W 5%
8	5010-08983-00	R7, R8, R9	RES. 3.3K 1/4 W 5%
9	5010-08991-00	R1, R4, R5, R11, R12, R25 - R28, R33, R36, R37, R49, R50	RES. 4.7K 1/4 W 5%
10	5010-08998-00	R2, R3	RES. 2.2K 1/4 W 5%
11	5010-09034-00	R17, R22 - R24, R34	RES. 10K 1/4 W 5%
12			
13	5010-09161-00	R35, R45	RES. 2.2 Ω 1/4 W 5%
14	5010-09162-00	R39	RES. 100K 1/4 W 5%
15	5010-09179-00	R10	RES. 3.3M 1/4 W 5%
16	5010-09181-00	R44, R48	RES. 1 Ω 1/2 W 5%
17	5010-09219-00	R38	RES. 8.2K 1/4 W 5%
18	5010-09324-00	R6, R19, R20, R21	RES. 27K 1/4 W 5%
19	5010-09331-00	R16	RES. 13K 1/4 W 5%
20	5010-09333-00	R29	RES. 180K 1/4 W 5%
21	5010-09342-00	R30	RES. 36K 1/4 W 5%
22	5010-09358-00	R41, R42	RES. 1K 1/4 W 5%
23	5010-09361-00	R43, R46, R47	RES. 220 Ω 1/2 W 5%
24	5010-10258-00	R40	RES. 1M 1/4 W 5%
25	5010-10985-00	R14, R15	RES. 20K 1/4 W 5%
26	5013-09427-00	R13	RES. 4.99K 1/4 W 5%
27	5040-09343-00	C1, C3, C4, C8, C17	CAP. 10M 20V +/- 20%
28	5040-09365-00	C11	CAP. 1M 63V +50% -10%
29	5040-09776-00	C26, C30	CAP. 470M 16V +50% -10%
30	5040-10974-00	C12, C19, C24	CAP. 100M 35V
31	5040-12006-00	C29, C32	CAP. 1000M 16V 20% RD.
32	5041-09243-00	C25, C28	CAP. 10M 10V +/-10%
33	5043-08980-00	C5, B(17)	CAP. .01M 50V +80% -20%
34	5043-08996-00	C31, C33	CAP. 1M 50V +/-20%
35	5043-09065-00	C13, C14, C15	CAP. 470P 50V +/-20%
36	5043-09492-00	C2, C34	CAP. 100P 50V +/-20%
37	5043-09844-00	C6	CAP. 47P 50V +/-20% AX
38	5043-09845-00	C16, C18, C20 - C23, C27	CAP. 1KP 50V +/-20% AX
39	5046-09346-00	C7	CAP. 1200P 50V +/-5%
40	5046-09350-00	C9	CAP. 180P 100V +/-5%
41	5048-10992-00	C10	CAP. 4700P 50V +/-10%
42	5060-10396-00	SP1	SIP 4.7K 470P 8RBC
43	5160-10269-00	Q1	TRANS 2N3904 NPN
44	5281-09215-00	U2	IC 74LS04 HEX INV
45	5281-09235-00	U21	IC 74LS10 TRPL NAN
46	5281-09246-00	U14	IC 74LS139 2-4 DEC
47	5281-09487-00	U7, U16	IC 74LS74 DUAL D F/F
48	5281-09745-00	U15	IC 74LS138 DMLTPX
49	5281-10043-00	U13	IC 74LS175
50	5340-10139-00	U5	RAM/S 5516-2 2KX8
51	5370-09156-00	U22, U23	IC 2002 AUD AMP
52	5370-09321-00	U9, U10, U17, U18	IC 1458 OP - AMP
53	5370-09691-00	U6	IC 55536-9 CVSD
54	5371-09152-00	U11	IC 1408 D/A CONV
55	5430-10322-00	U12	IC 68B21 PIA 2MHz
56	5520-09020-00	X1	Crystal 3.58MHz
57	5521-10931-00	CR1	OSC 8 MHz
58	5551-09822-00	L1, L2, L3	IND 4.7 UH 3A
59	5700-08985-00	U8	Socket IC 40 Pin
60	5700-09004-00	U3	Socket IC 24 Pin
61	5700-09006-00	U1	Socket IC 16 Pin
62	5700-12088-00	U4, U19, U20	Socket IC 32 Pin
63	5705-09199-00		Heat Sink #6030B
64	5766-12702-00		PCB Audio System
65	5791-09437-00	J4	20 HCN 2x10 ST
66	5791-10862-04	J1, J2, J5	4H STR SQ. Pin .156
67	5791-10862-06	J3	6H STR SQ. Pin .156

PROJ. ENGR. C. BLEICH
DWN. BY J. JACOBS DATE 6/13/90
CHECKED BY DATE
APPROVAL DATE 8/28/90

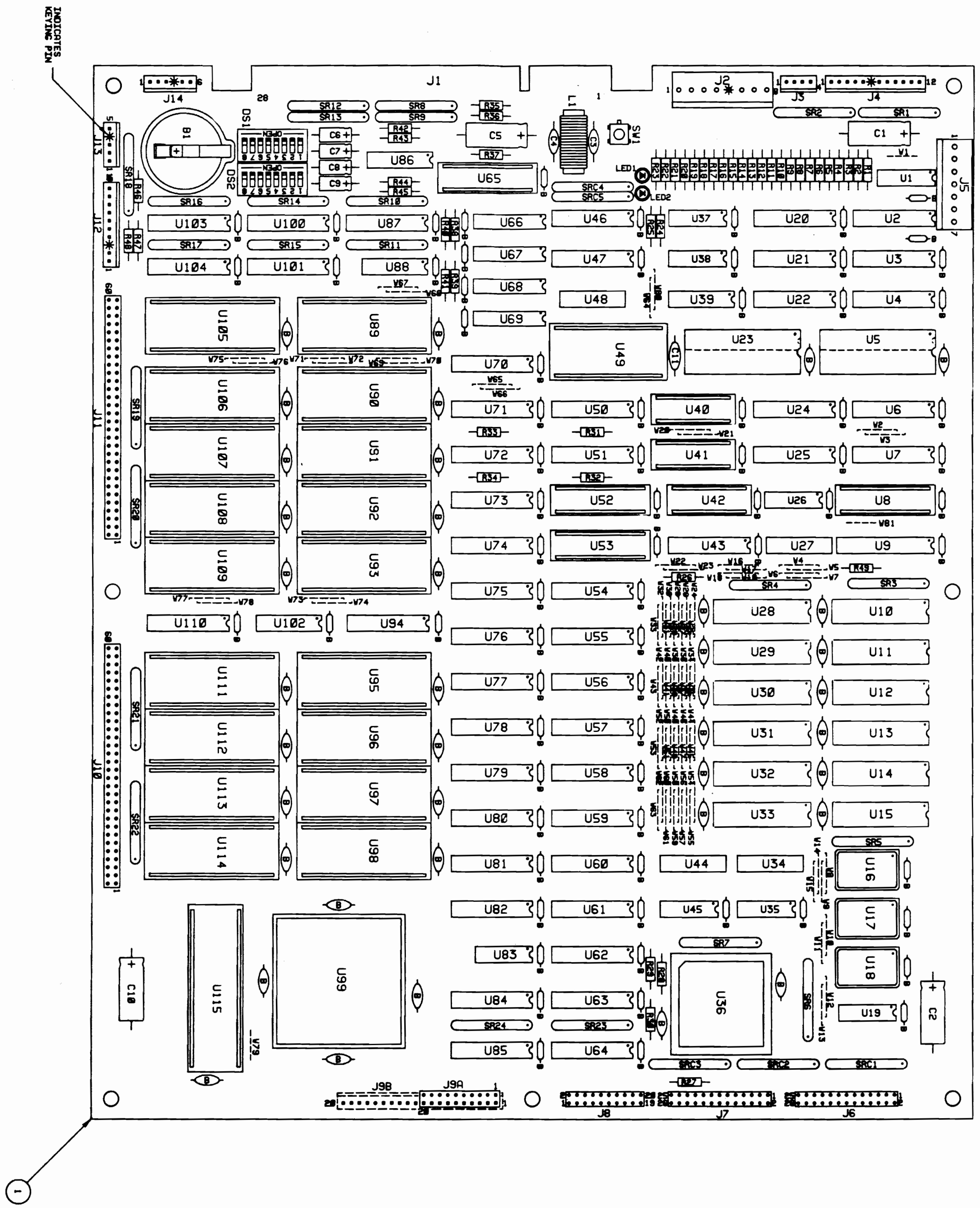
DO NOT SCALE! WORK TO DIMENSIONS SHOWN
FIRST PROJECT NO. 40004
FIRST USAGE A-13971 QTY 1

REMOVE BURRS-BREAK SHARP CORNERS & EDGES
TOLERANCES UNLESS OTHERWISE SPECIFIED
DECIMAL .x ± .030 .xx ± .015 .xxx ± .005 ANGULAR ±1/2° FRACTIONAL ±1/64
MATERIAL

WILLIAMS ELECTRONICS GAMES, INC. MIDWAY MANUFACTURING COMPANY
3401 N. CALIFORNIA AVE. CHICAGO, IL 60618
NAME AUDIO SOUND BDR SUB-ASSY
SCALE / SHT 1 OF 2 PART NO. A-13970- REV A

3970-

Y-UNIT CPU BOARD



Y-UNIT CPU ASSEMBLY
p/n C-13234-40004

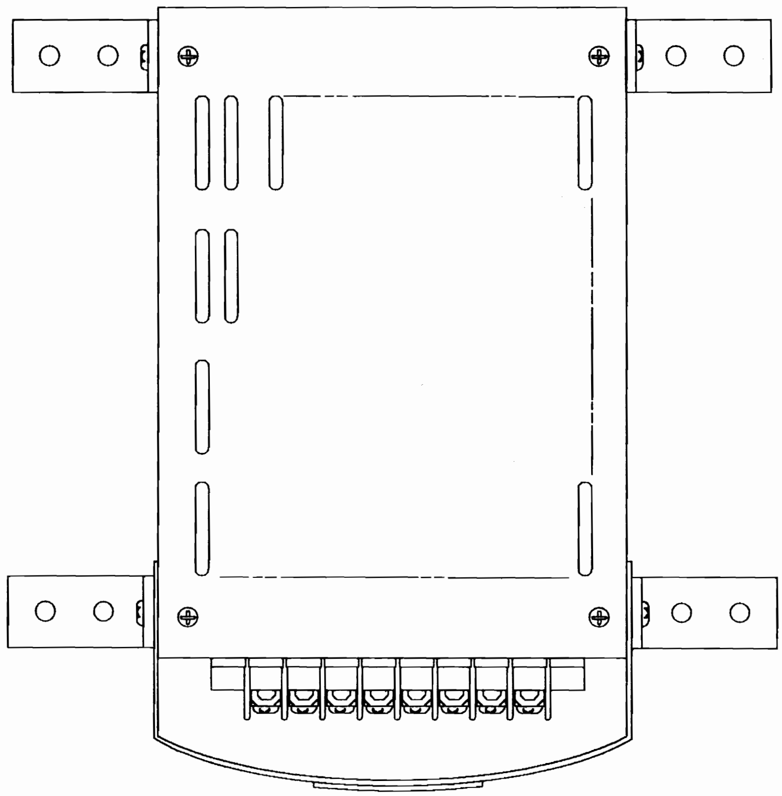
Part No.	Ckt.Designator	Description
5770-12555-00		Bare PC Brd.
5281-09737-00	U1	IC, 74LS 86
5317-12211-00	U2, U20, U24, U43	
	U61, U62, U70	IC, 74ALS541
5317-12212-00	U3, U6, U7, U21, U25	74ALS574
	U50, U58, U63, U64	
	U71, U72, U74, U79, U84, U85	
5317-12208-00	U4, U22, U54-U57	74ALS245
	U59, U60, U75-U78	
	U80, U81, U94, U110	
5340-12242-00	U5, U23	IC, 8K x 8 S RAM
5700-12047-00	U8, U52, U53, U65	24 pin Socket
5340-12213-00	U10, U11, U28-U33	IC, 4461 VRAM
5521-10421-00	U16	40 MHZ Xtal
5521-10318-00	U17	24 MHZ Xtal
5283-10468-00	U19, U45	IC, 74F74
5019-10849-00	U27, U34, U44, U48	100Ω DIP Res.
5317-12305-00	U35	IC, 74ALS00
5700-12253-00	U36	68 pin Socket
5280-09309-00	U37	IC, 7407
5281-09487-00	U38	IC, 74LS74
5434-12255-00	U39	IC, MAX691
5700-09915-00	U40-U42	20 pin Socket
5311-12287-00	U47, U46, U87, U100	IC, 74HC541
	U101, U103, U104	
5700-10176-00	U49	28 pin Socket
5311-12285-00	U51, U73, U82	IC, 74HC573
5340-12014-00	U66-U69	IC, 4464 DRAM
5283-10552-00	U83	IC, 74F04
5370-12602-00	U86	IC, ULN2064B
5317-12023-00	U88	IC, 74ALS138
5700-12088-00	U89-U93, U95-U98	32 pin Socket
	U105-U109, U111-U114	
5700-12254-00	U99	144 pin Socket
5317-12024-00	U102	IC, 74ALS139
5700-08985-00	U115	40 pin Socket
5010-08991-00	R1,R24, R27	Res. 4.7KΩ 5% 1/4W
5010-10204-00	R2, R7, R12	Res. 1KΩ 2% 1/4W
5010-10205-00	R3, R8, R13	Res. 2KΩ 2% 1/4W
5010-10000-00	R4, R9, R14	Res. 3.9KΩ 5% 1/4W
5010-09219-00	R5, R10, R15	Res. 8.2KΩ 5% 1/4W
5010-08772-00	R6, R11, R16	Res. 15KΩ 5%1/4W
5010-09001-00	R23, R25	Res. 330Ω 5% 1/4W
5010-09036-00	R50, R51	Res. 100Ω 5% 1/4W
5010-09416-00	R35-R37, R46-R48	Res. 470Ω 5% 1/4W
5010-08997-00	R38-R45	Res. 2.7Ω 5% 1/4W
5010-09534-00	W2, W8, W11, W12,	Res. 0Ω
	W14, W21, W22, W24,	
	W27, W29, W31, W32,	
	W34, W36, W39, W41,	
	W45, W47, W48, W50,	
	W42 , W52, W55, W57,	
	W60, W62, W66, W68,	
	W58, W69, W71, W73,	
	W75, W77, W80	
5043-08980-00	B	Cap. .01 µfd 10V
5040-08986-00	C1, C2, C5, C10	Cap. 100µfd 10V
5043-09845-00	C3, C4	Cap. .001µfd 10V
5041-09243-00	C6-C9	Cap. 10µfd 10V
5043-08996-00	C11	Cap. .1µfd
5019-12611-00	SR1, SR2, SR8	SIP, 470Ω 5 Res.
	SR9, SR12, SR13, SR18	

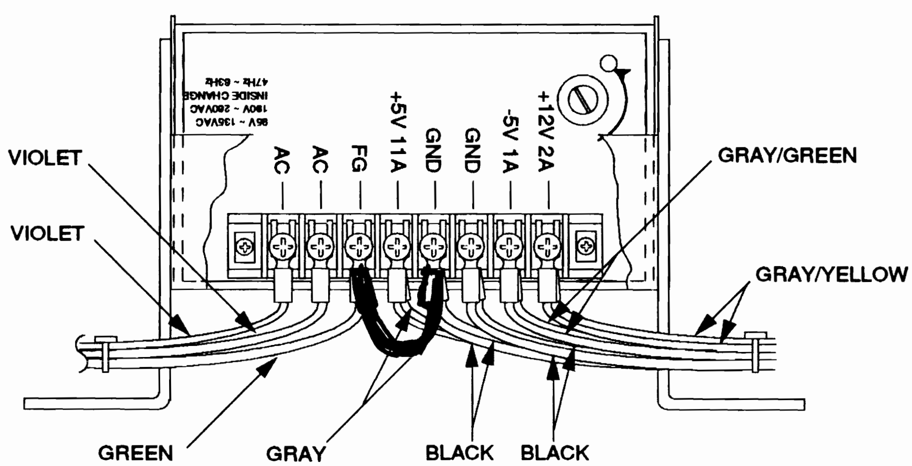
Part No.	Ckt.Designator	Description
5019-09362-00	SR3, SR4, SR6	SIP, 4.7KΩ
	SR7, SR11, SR15	
	SR17, SR19-SR24	
	SRC1-SRC3	
5019-10143-00	SR5	SIP, 470Ω 9 Res.
5060-10396-00	SRC4, SRC5	SIP. 4.7KΩ 470pf
	SRC10, SRC14	
	SRC16	
5671-09019-00	LED1, LED 2	LED, Red
5551-09822-00	L1	Inductor, 4.7UH
5645-09025-00	DS1, DS2	DIP. Sw. 16 pin
5641-12551-00	SW1	Pushbutton Sw.
5881-12315-00	B1	Battery Holder
5791-10862-00	J2	8 pin Connector
5791-12461-00	J4	12 pin Connector
5791-10850-00	J6, J7	26 pin Ribbon Connector
5791-09437-00	J8	20 pin Ribbon Connector
5791-12461-10	J12	10 pin Connector
5791-12461-05	J13	5 pin Connector
5700-12252-00	U12-U15	24pin Connector

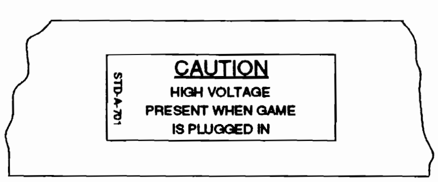
Part No.	Ckt. Designator	Description
C13235-3		CPU Subassembly (includes all parts except the following list)
A-5343-40004-1	U89	IC, Game EPROM
A-5343-40004-10	U105	IC, Game EPROM
A-5343-40004-11	U106	IC, Game EPROM
A-5343-40004-12	U107	IC, Game EPROM
A-5343-40004-13	U108	IC, Game EPROM
A-5343-40004-14	U109	IC, Game EPROM
A-5343-40004-15	U111	IC, Game EPROM
A-5343-40004-16	U112	IC, Game EPROM
A-5343-40004-17	U113	IC, Game EPROM
A-5343-40004-18	U114	IC, Game EPROM
A-5343-40004-2	U90	IC, Game EPROM
A-5343-40004-3	U91	IC, Game EPROM
A-5343-40004-4	U92	IC, Game EPROM
A-5343-40004-5	U93	IC, Game EPROM
A-5343-40004-6	U95	IC, Game EPROM
A-5343-40004-7	U96	IC, Game EPROM
A-5343-40004-8	U97	IC, Game EPROM
A-5343-40004-9	U98	IC, Game EPROM
A-5346-40004-1	U8	IC, PLD Color RAM Control
A-5346-40004-2	U40	IC, PLD Address Decode
A-5346-40004-3	U41	IC, PLD Video RAM Control
A-5346-40004-4	U42	IC, PLD Local Control
A-5346-40004-5	U52	IC, PLD Video RAM Sequencer
A-5346-40004-6	U53	IC, PLD Image ROM Control
A-5346-40004-7	U65	IC, PLD Miscellaneous Control
A-5346-40004-8	U115	IC, PLD Autoerase Controller
5340-12558-00	U49	IC, 8K x 8 Static RAM 150ns Low Power
5400-12220-00	U36	IC, TMS34010-50 GSP
5410-12239-00	U99	IC, Custom Asic
5880-11056-00	B1	Battery, Lithium 3V
5340-12213-00	U12-U15	IC, 4461 VRAM, 64 x 4 150ns
03-8338-1		Spacer, 1/4"

POWER SUPPLY SWITCHER ASSEMBLY
p/n C-13253

Part Number	Description
20-9633	Power Supply, 85W
01-9254	Shield
16-8587-701	High Voltage Label





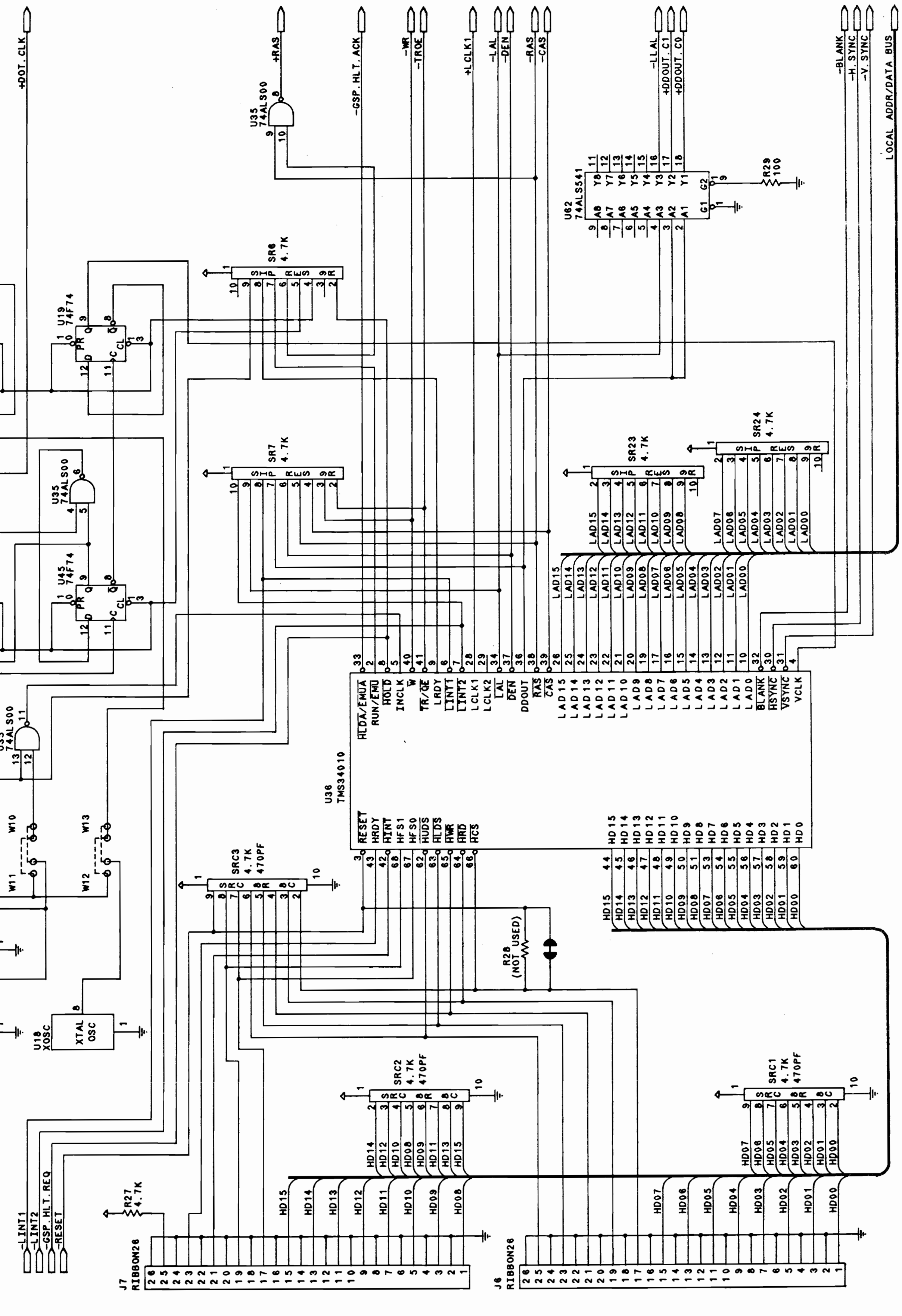


HIGH IMPACT FOOTBALL

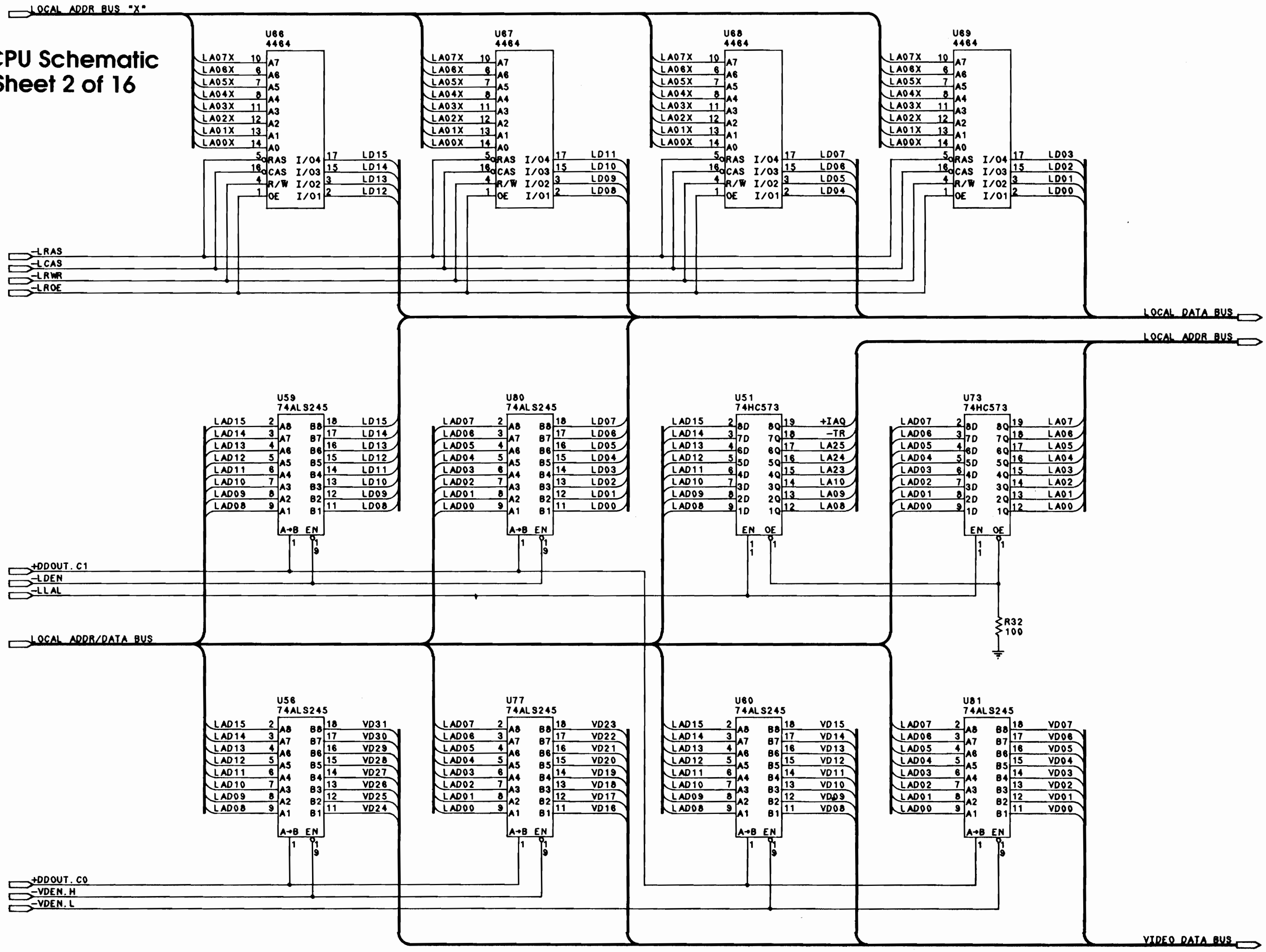
S E C T I O N
THREE

DIAGRAMS & SCHEMATICS

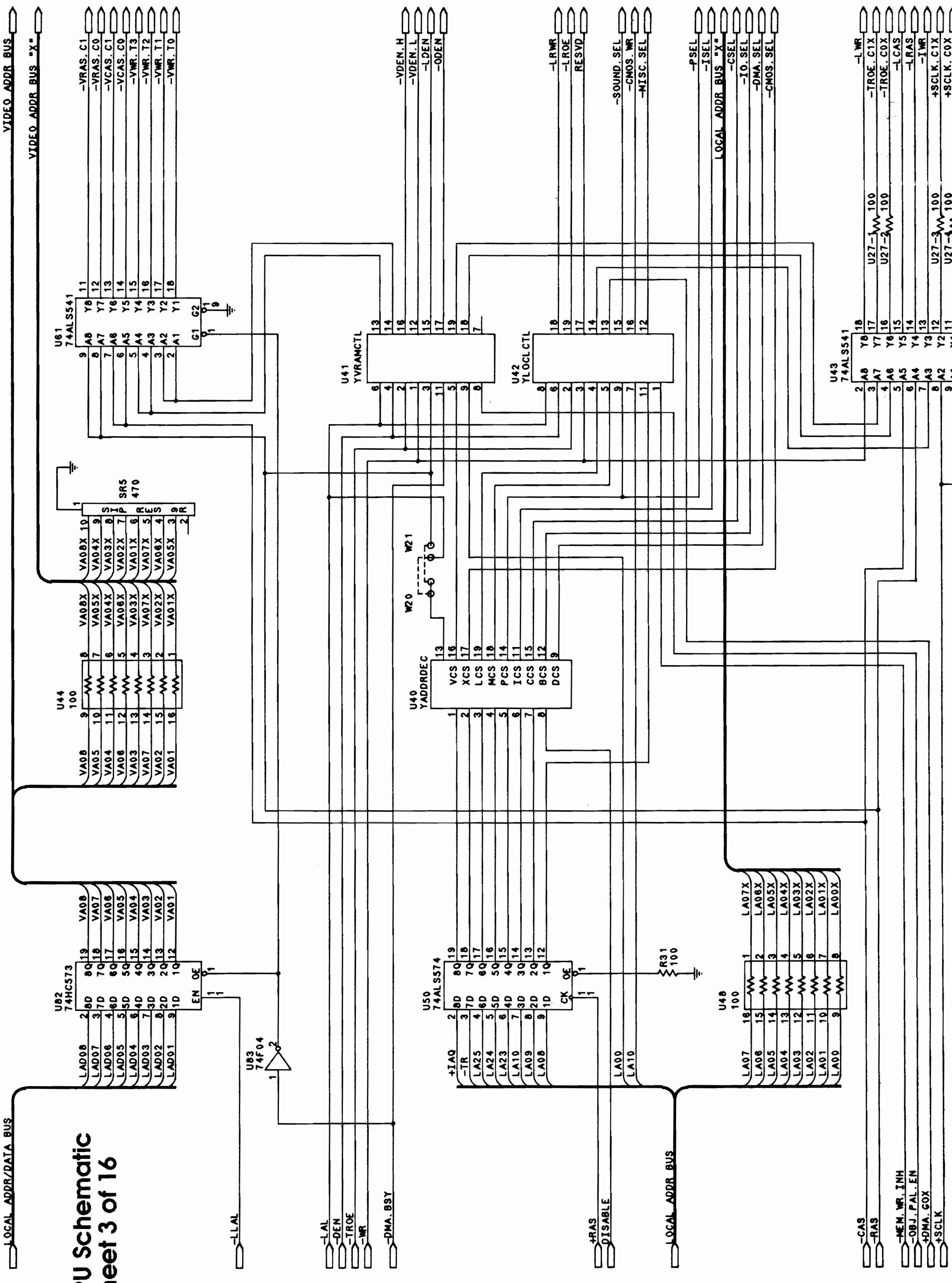
CPU Schematic Sheet 1 of 16



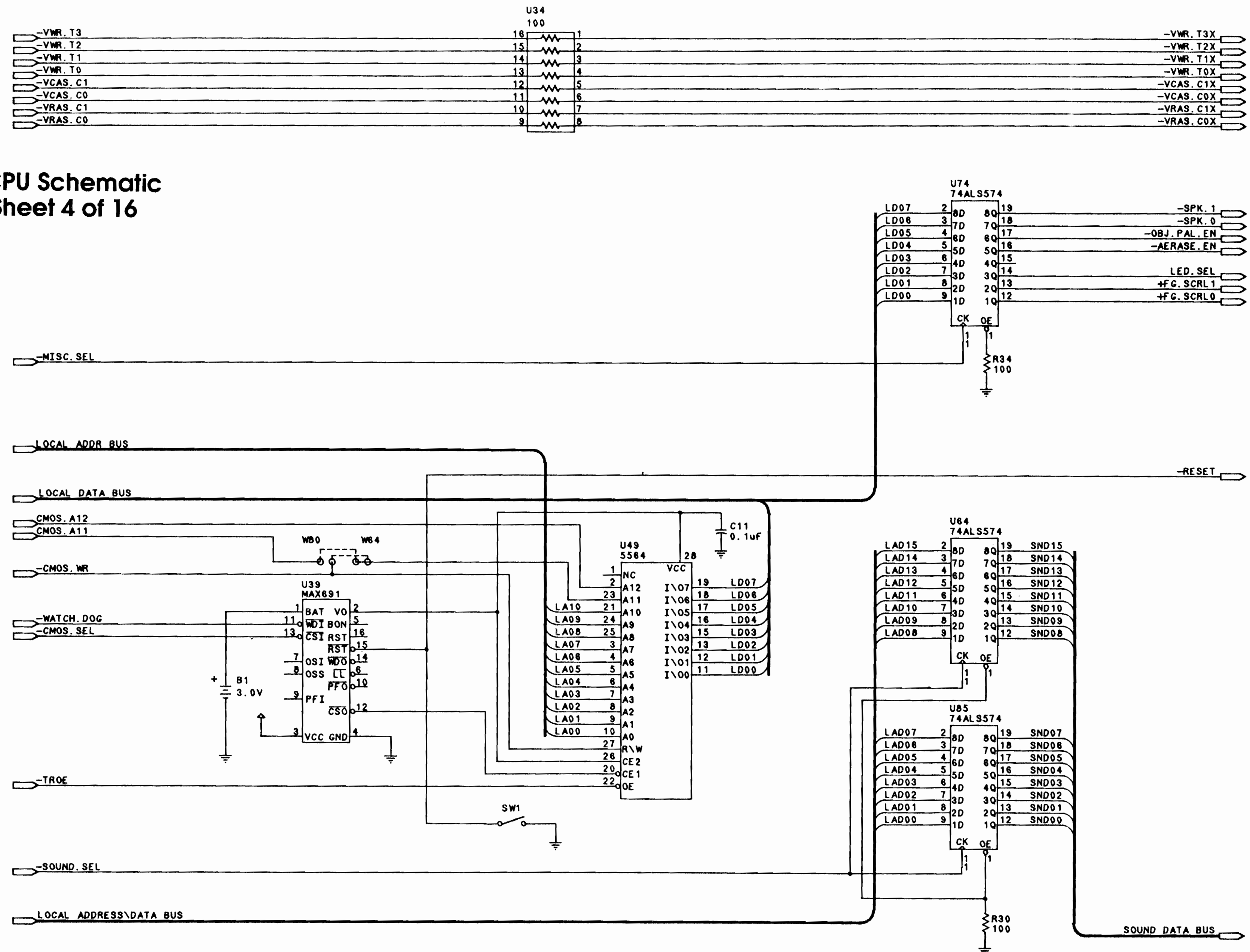
CPU Schematic
Sheet 2 of 16



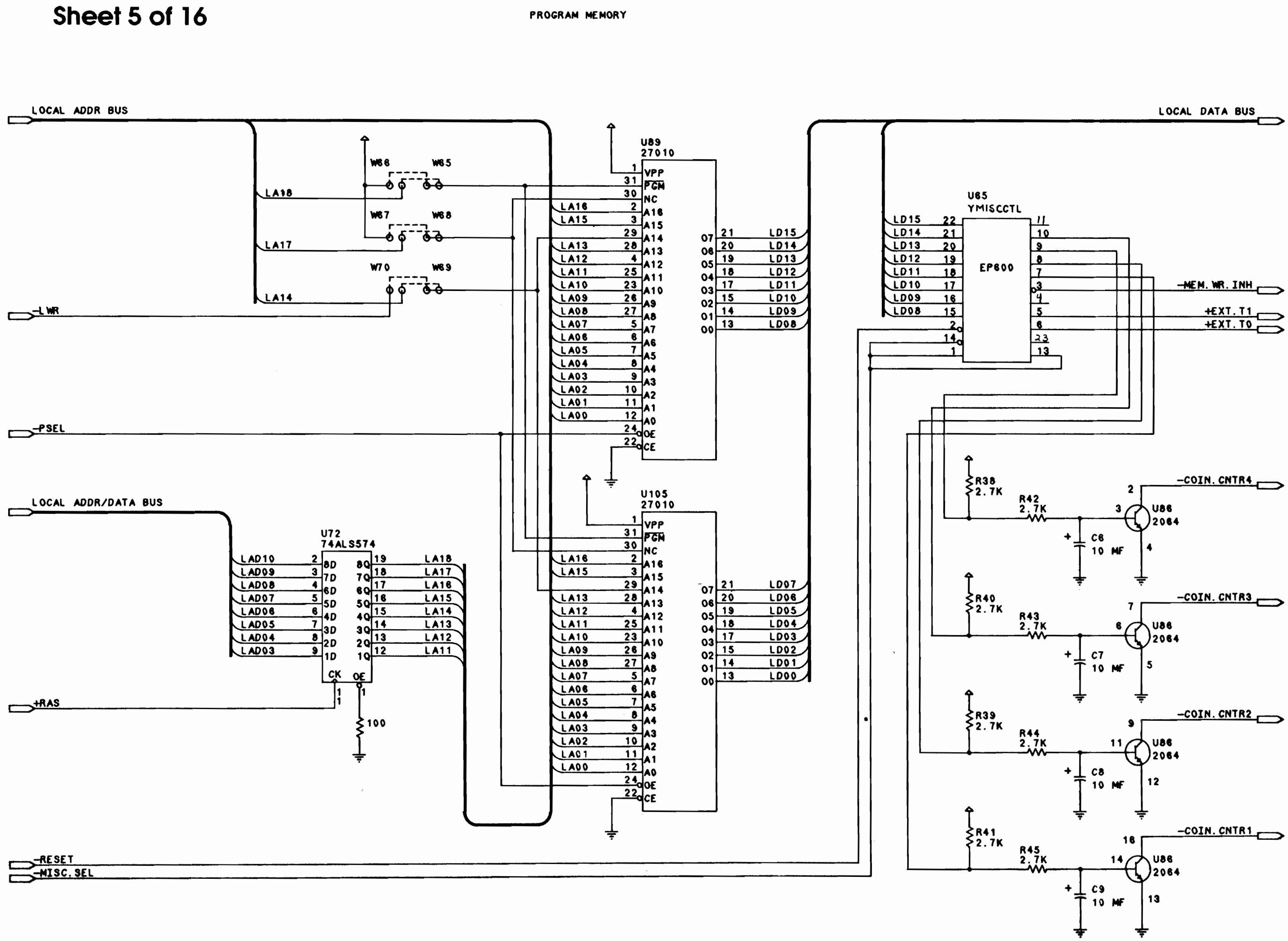
CPU Schematic
Sheet 3 of 16



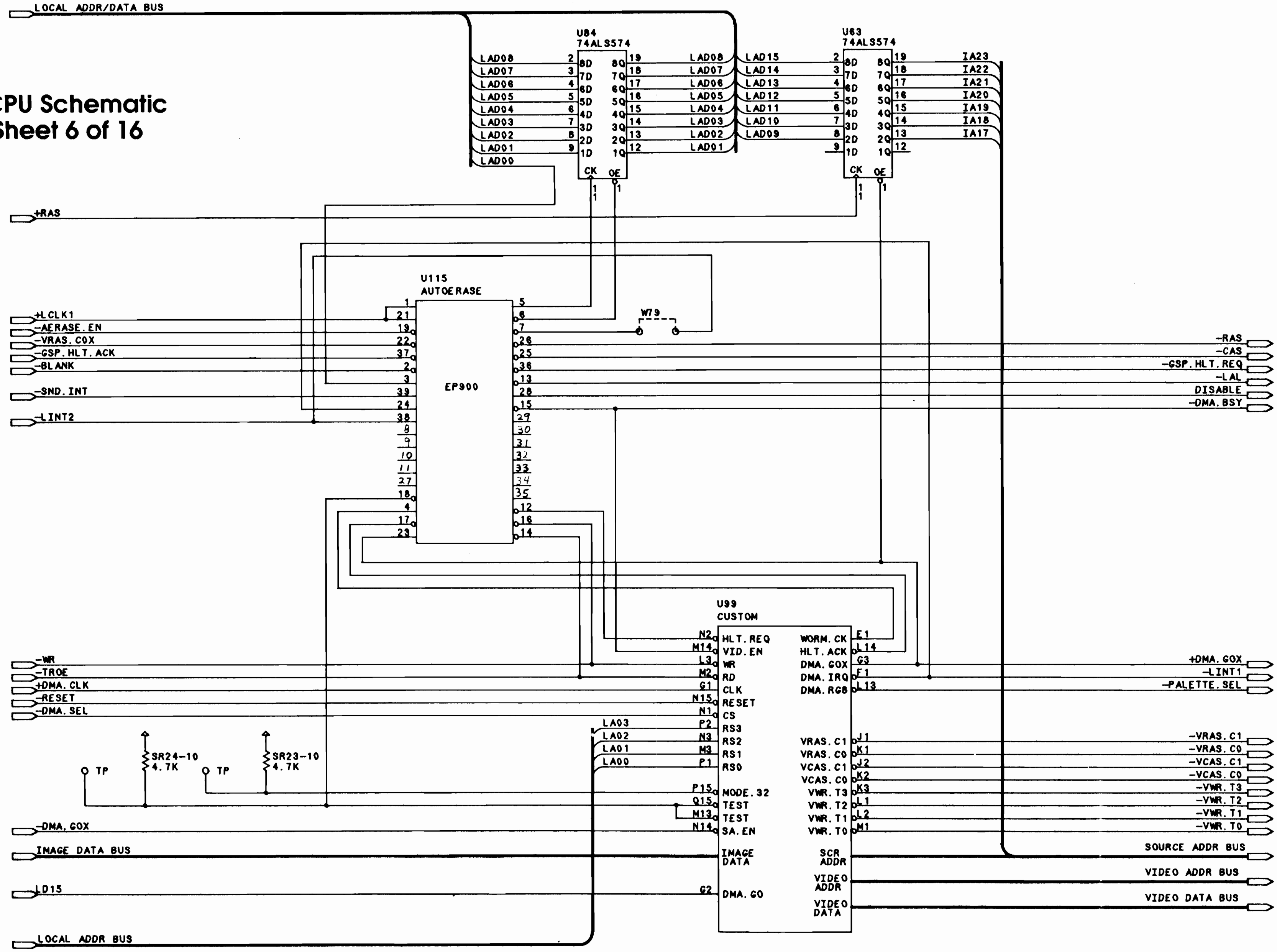
CPU Schematic
Sheet 4 of 16



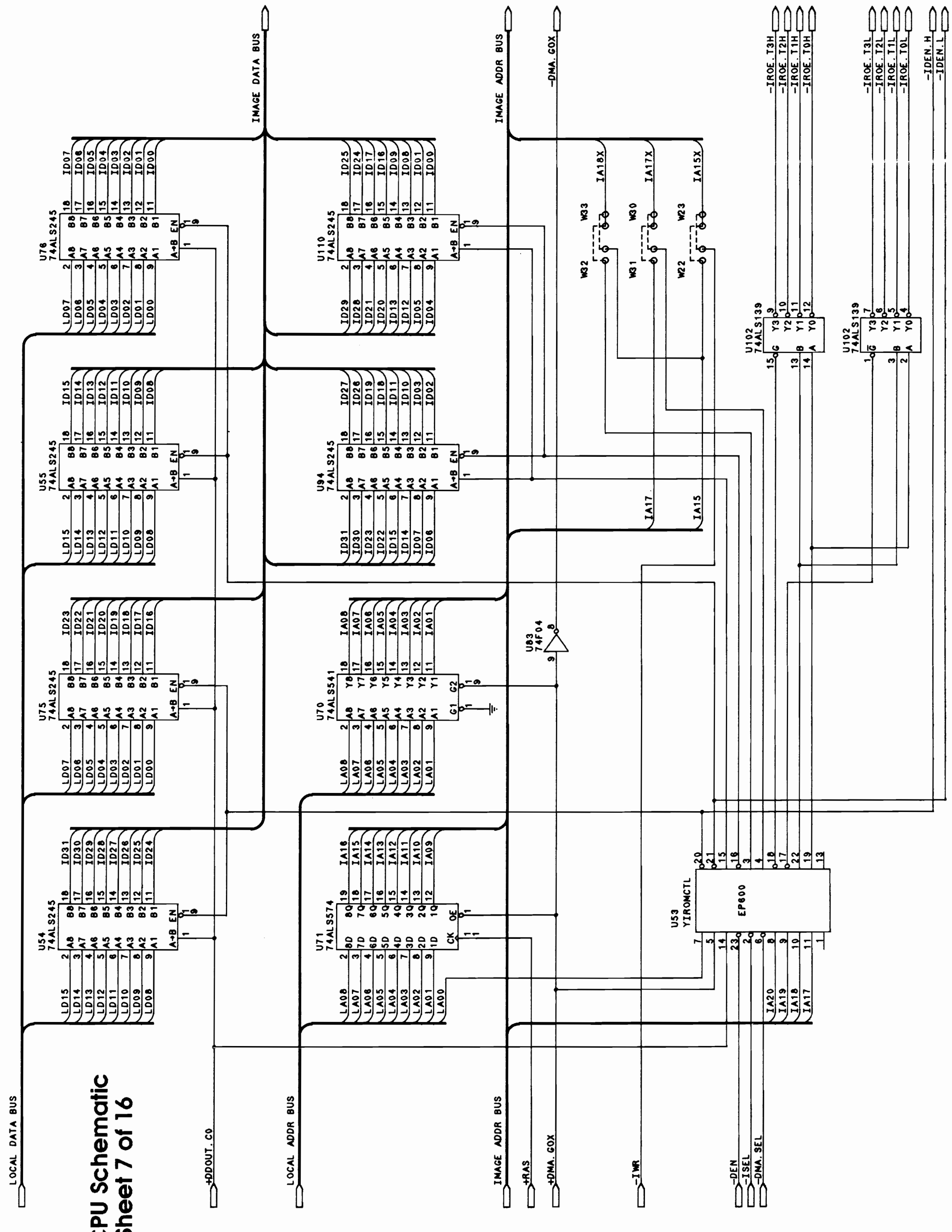
CPU Schematic
Sheet 5 of 16



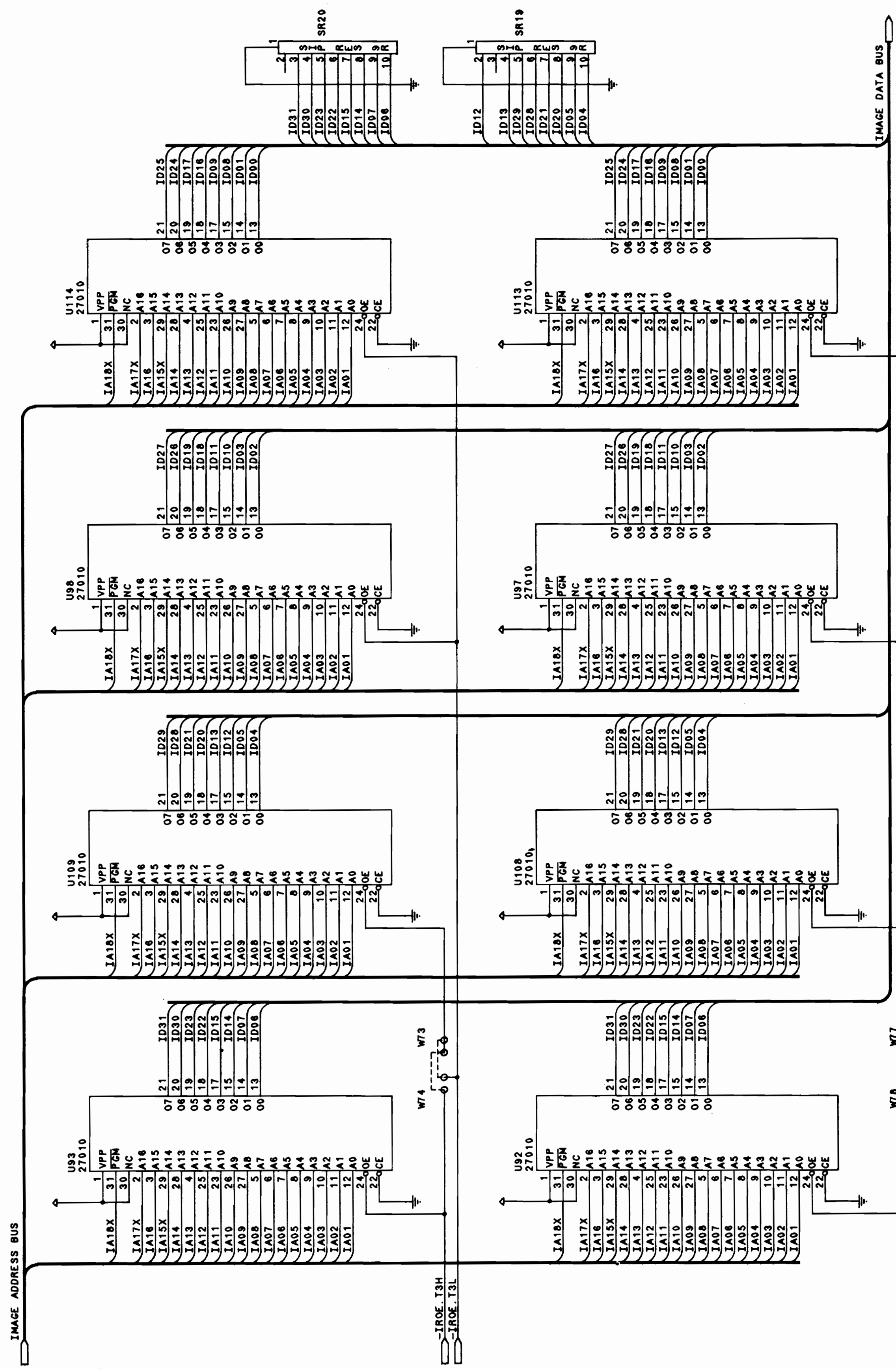
CPU Schematic
Sheet 6 of 16



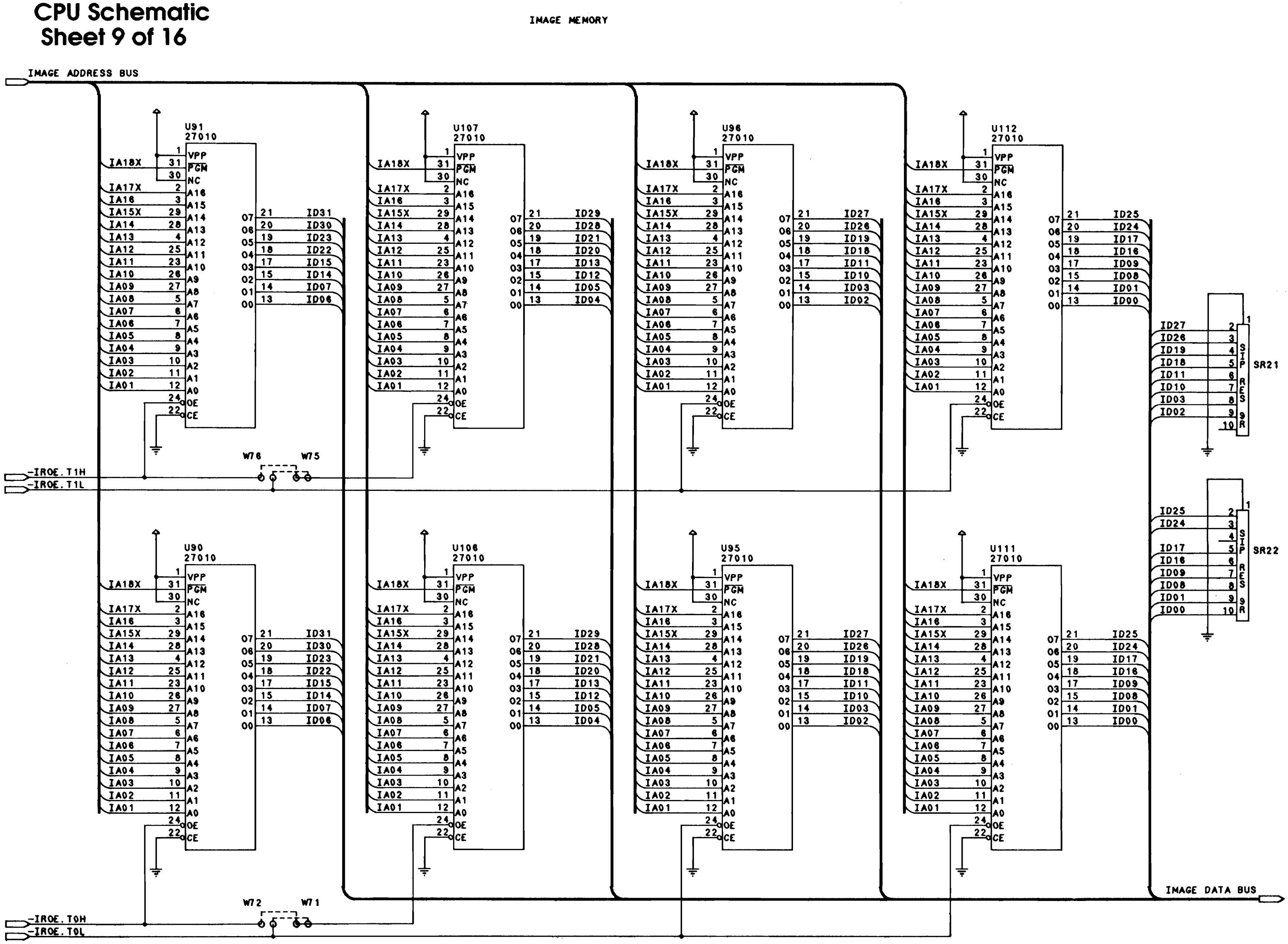
CPU Schematic
Sheet 7 of 16



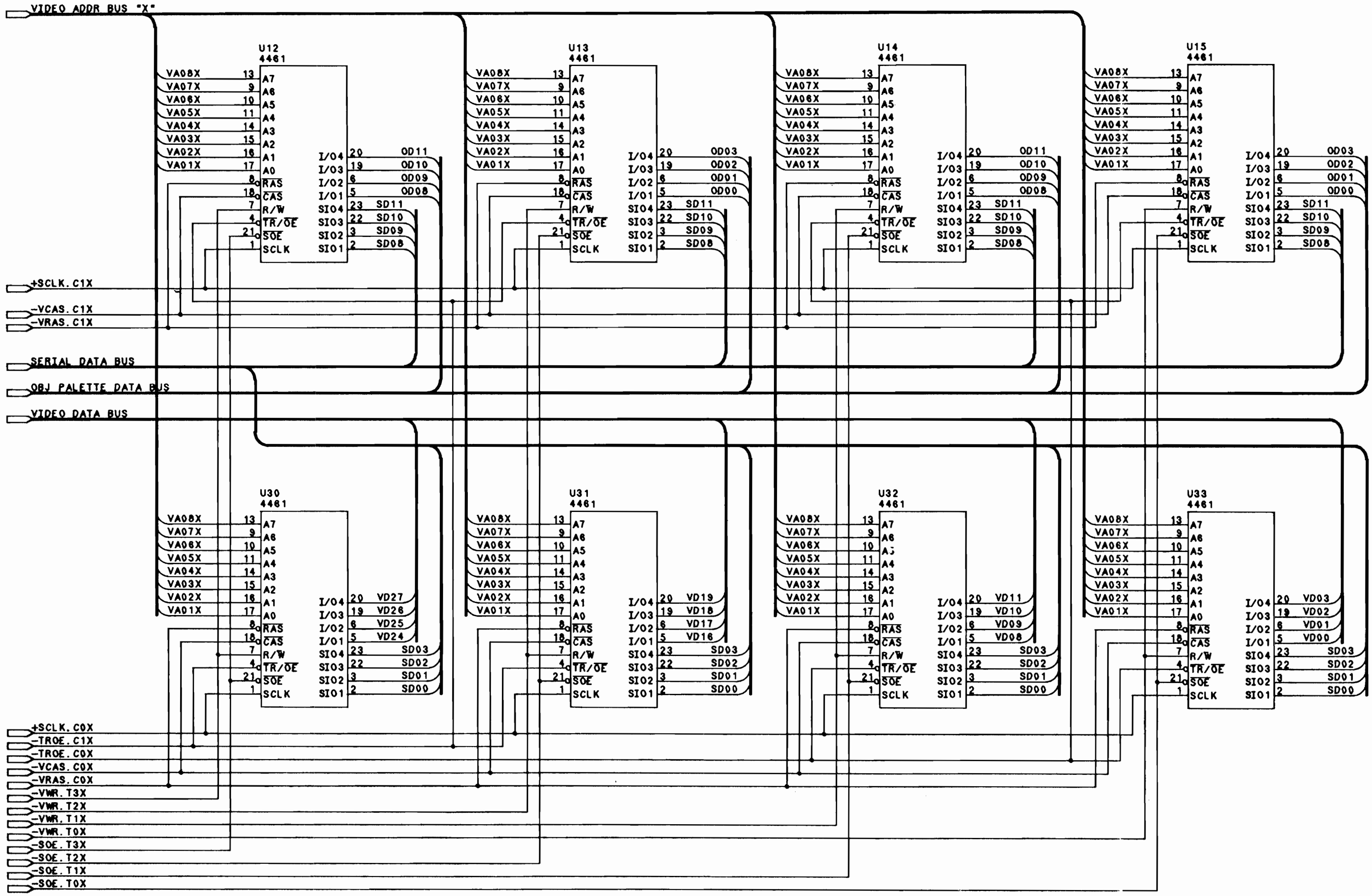
CPU Schematic
Sheet 8 of 16

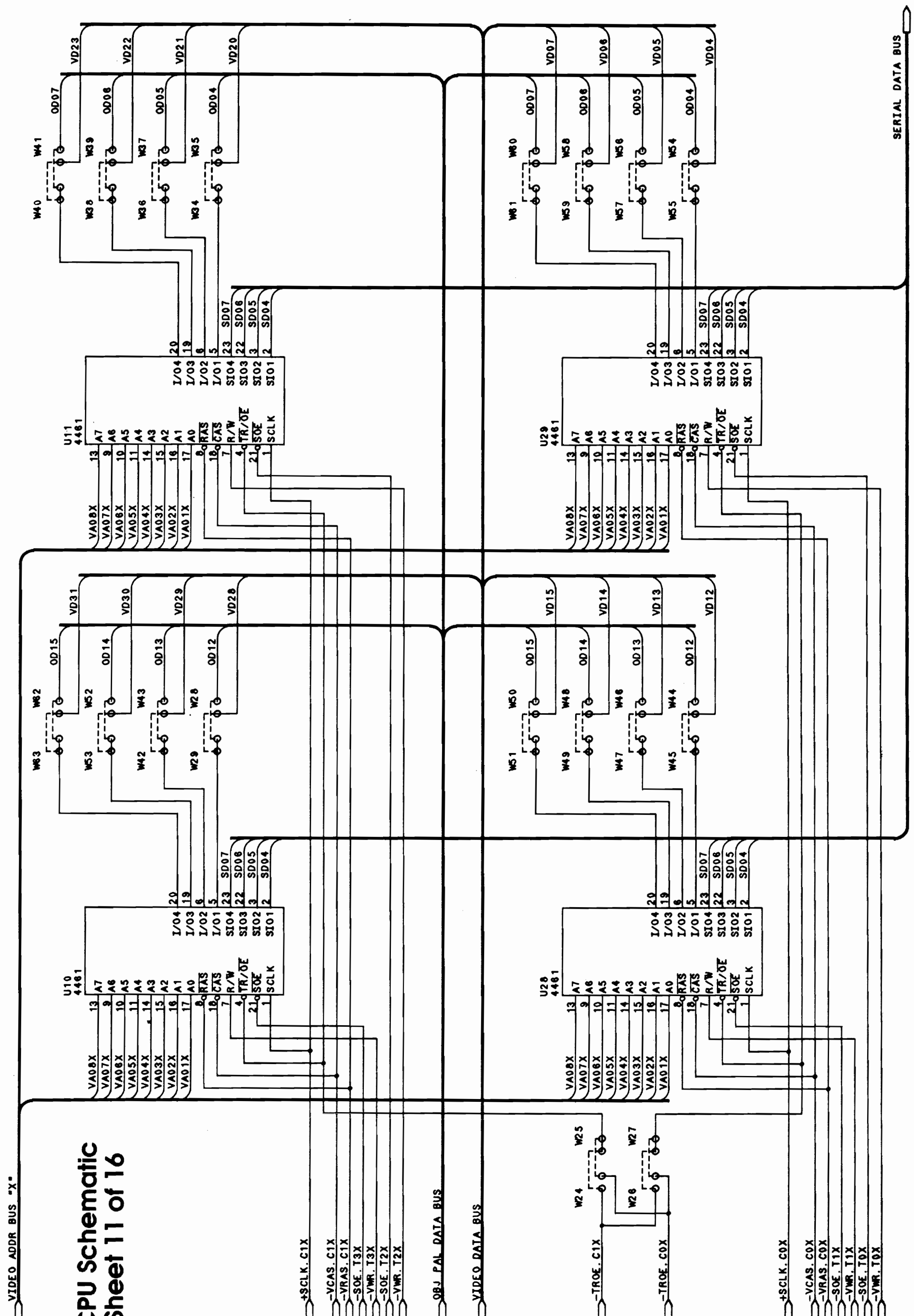


CPU Schematic
Sheet 9 of 16

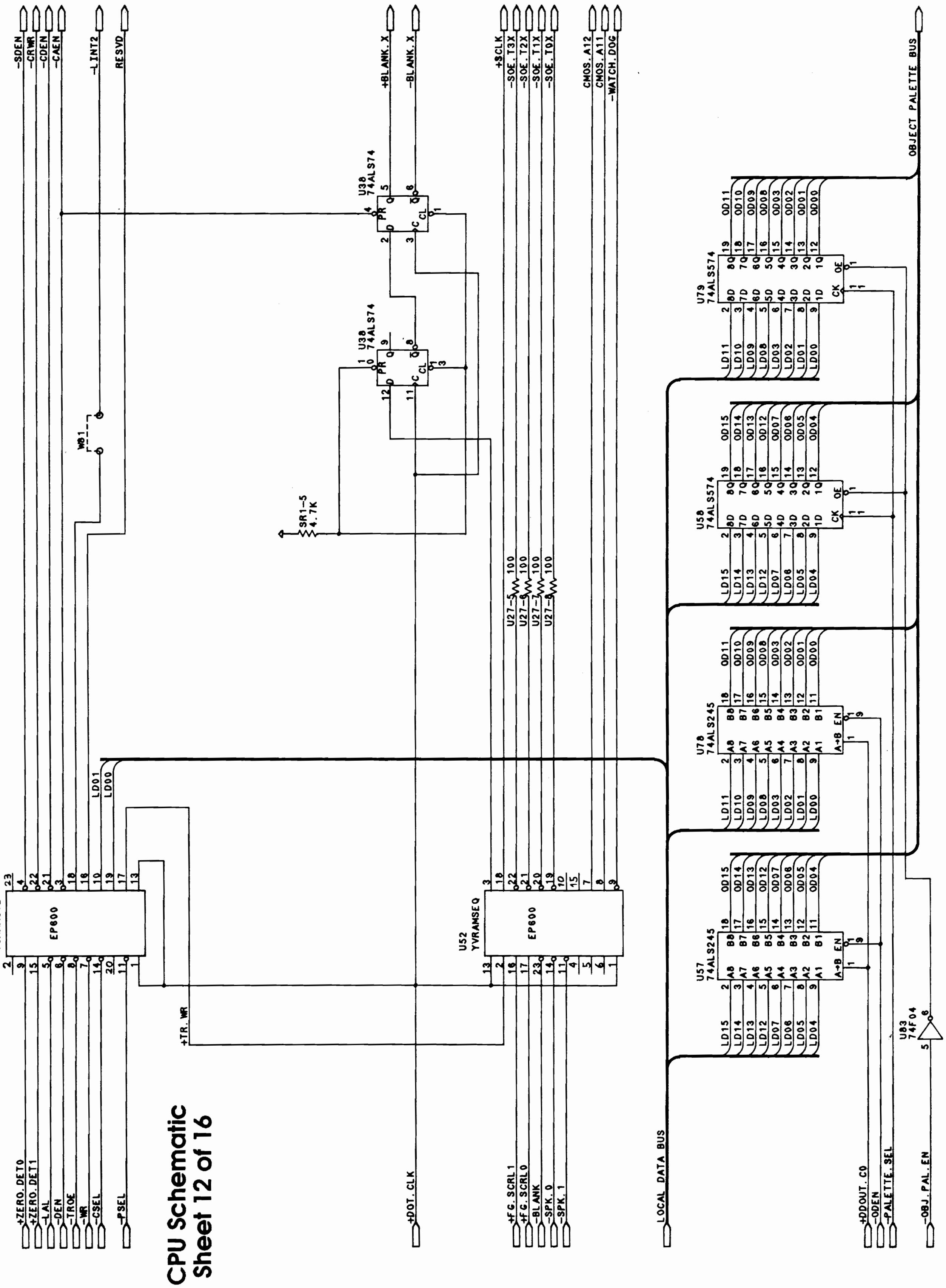


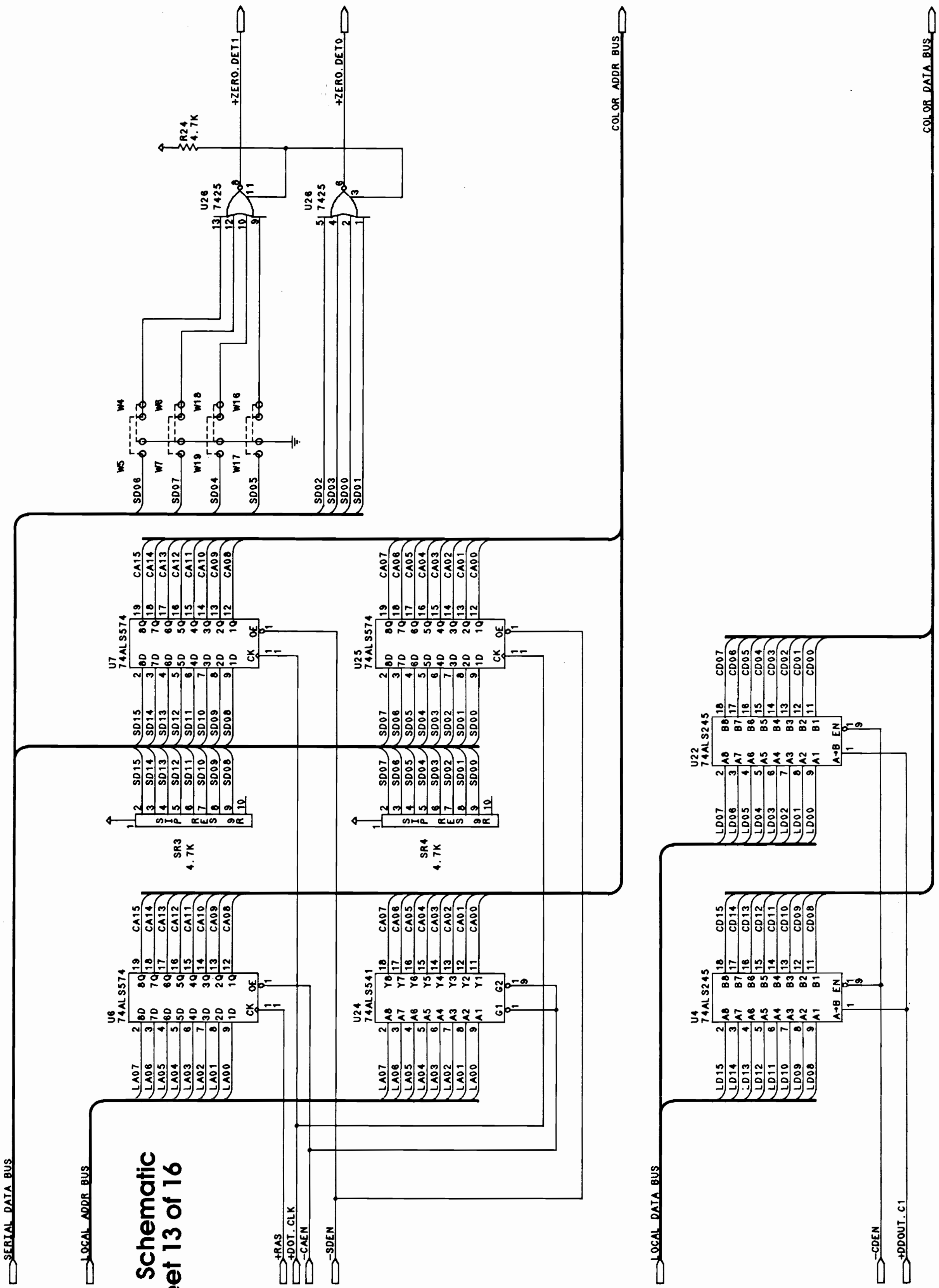
CPU Schematic
Sheet 10 of 16




CPU Schematic
Sheet 11 of 16
VIDEO ADDR BUS "X"
OBJ PAL DATA BUS
VIDEO DATA BUS
SERIAL DATA BUS
+SCLK.C1X
-VCAS.C1X
-VRAS.C1X
-SOE.T3X
-VWR.T3X
-SOE.T2X
-VWR.T2X
-TROE.C1X
-TROE.C0X
+SCLK.C0X
-VCAS.C0X
-VRAS.C0X
-SOE.T1X
-VWR.T1X
-SOE.T0X
-VWR.T0X
U10 4461
U11 4461
U28 4461
U29 4461

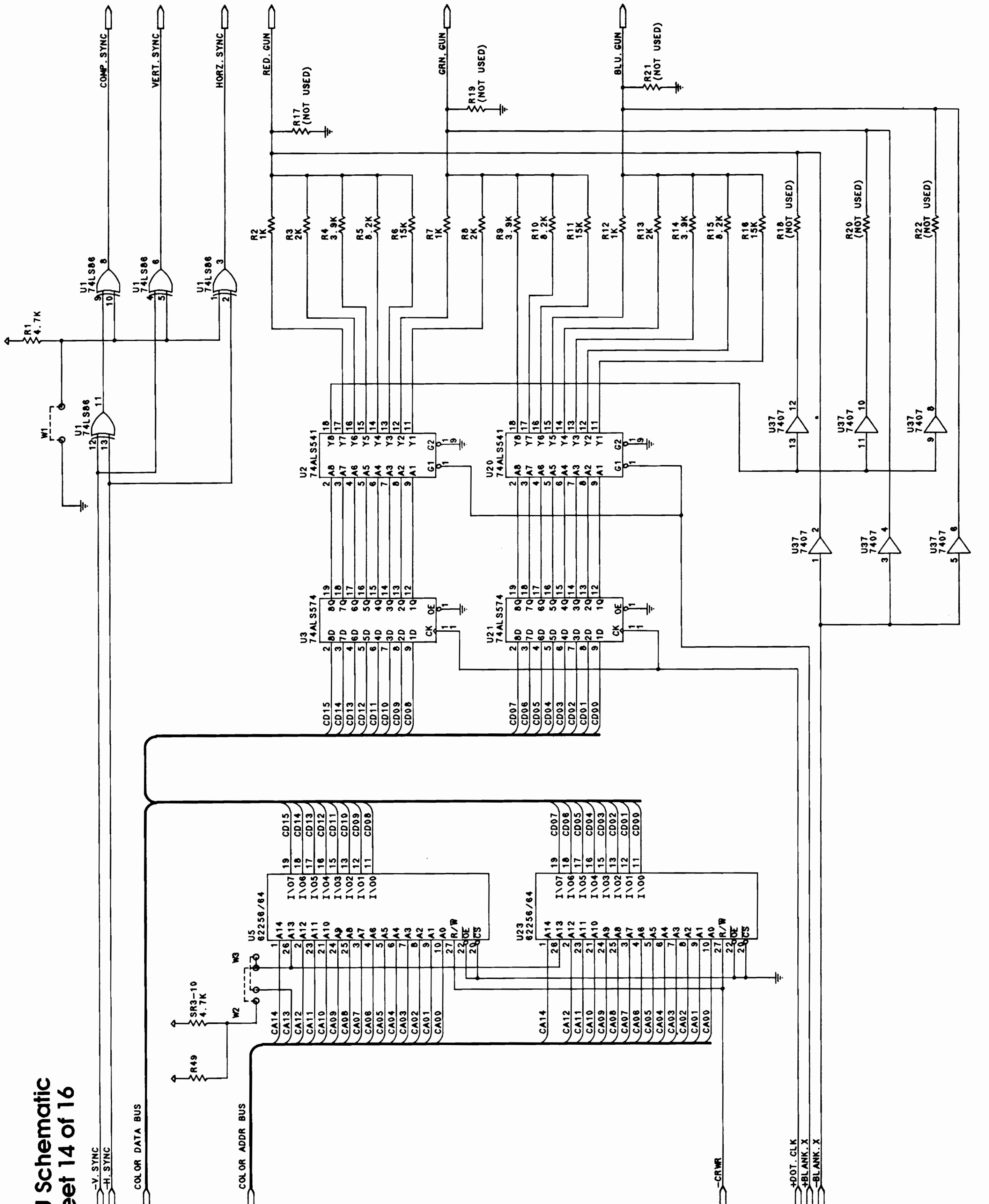
CPU Schematic
Sheet 12 of 16

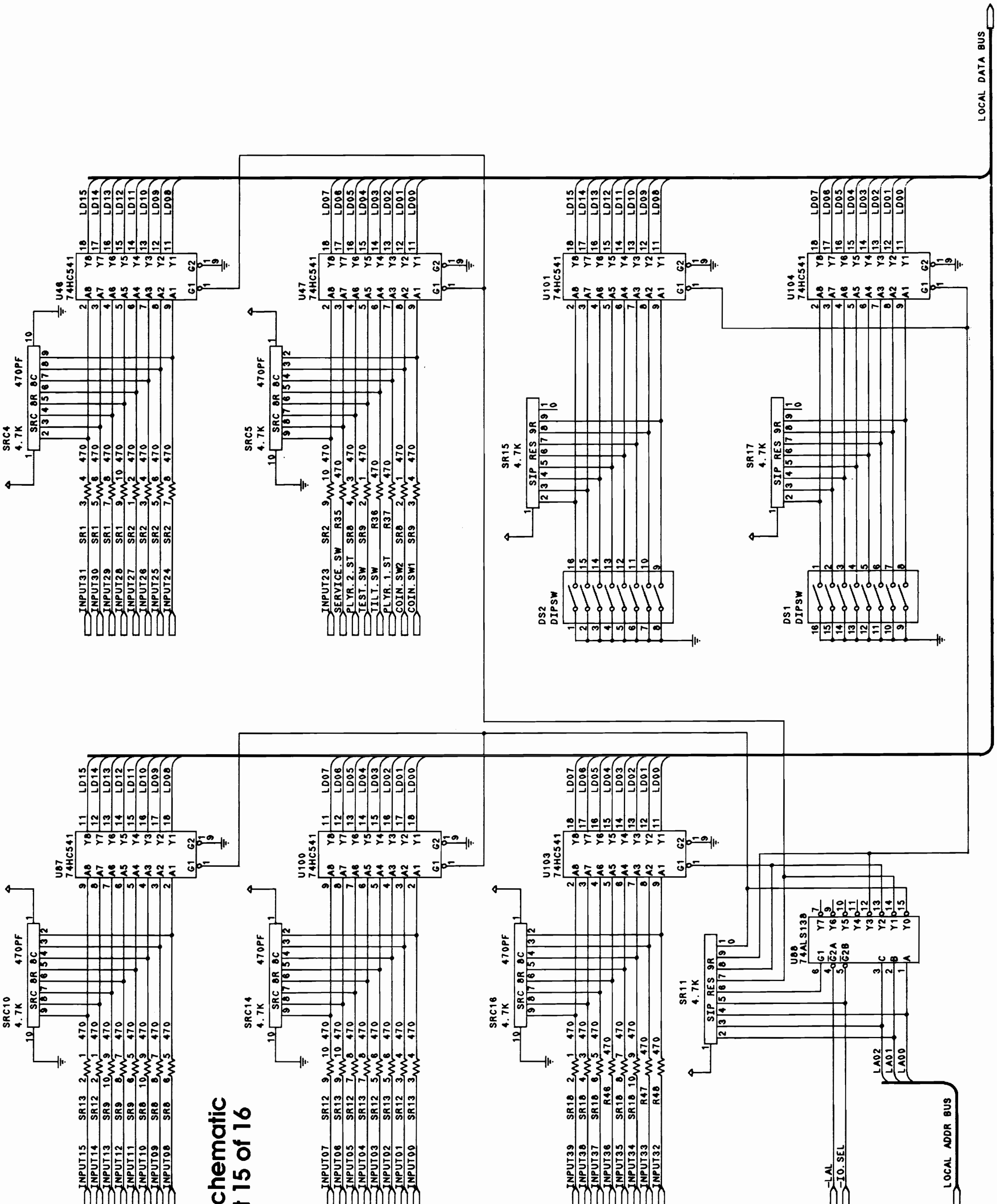




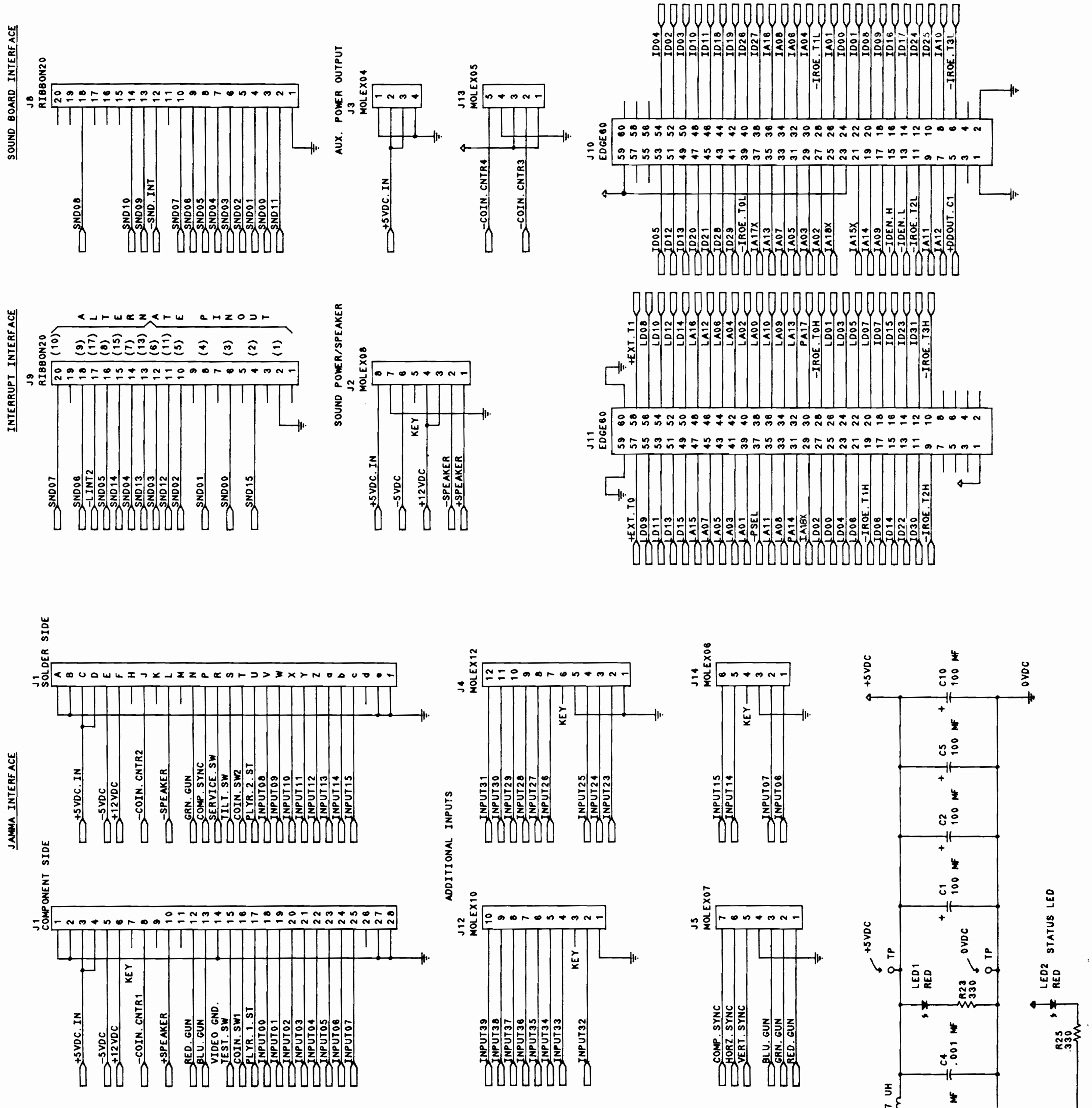
CPU Schematic
Sheet 13 of 16

CPU Schematic
Sheet 14 of 16





CPU Schematic
Sheet 15 of 16



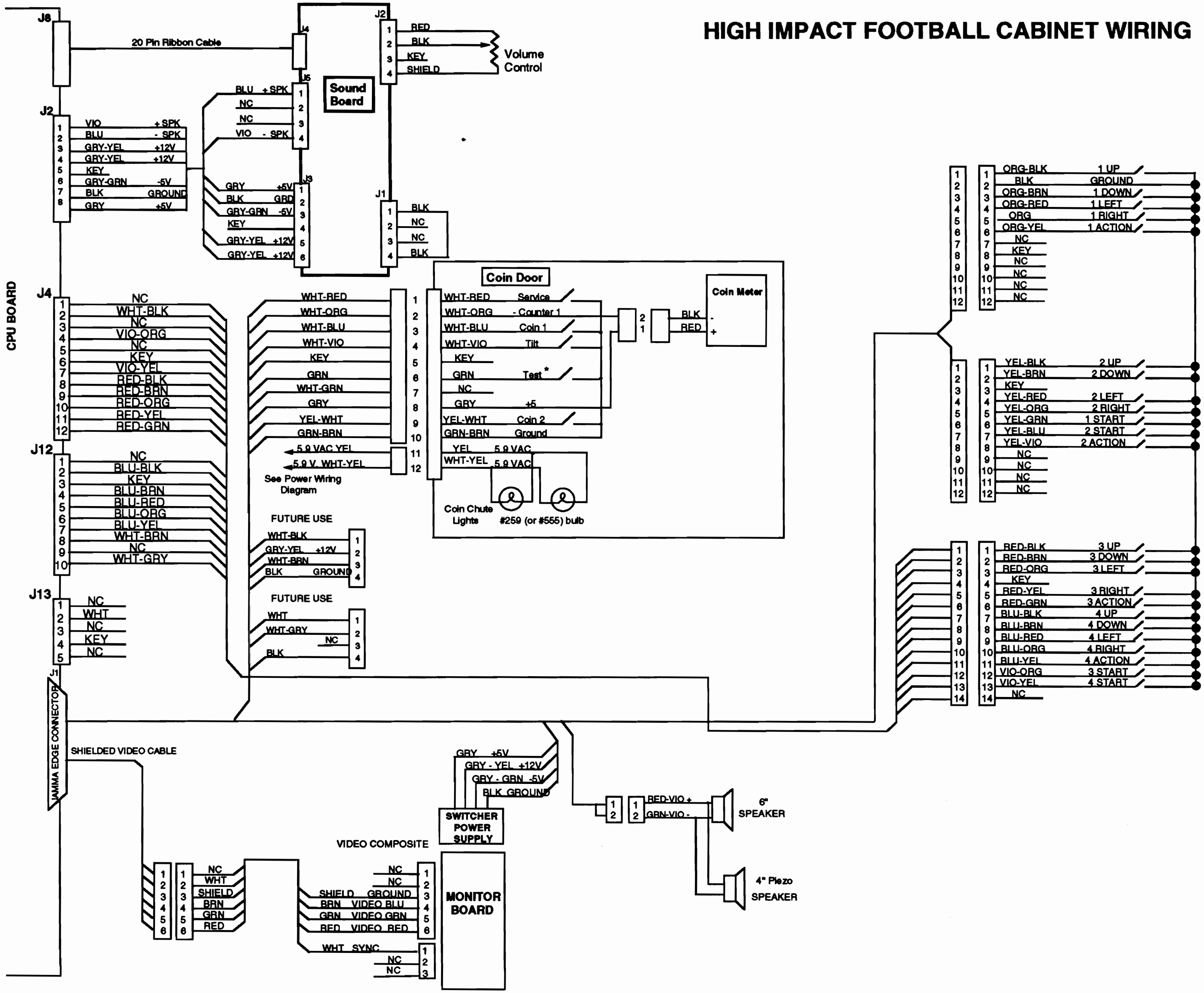
CPU Schematic Sheet 16 of 16

HIGH IMPACT FOOTBALL
JAMMA Chart

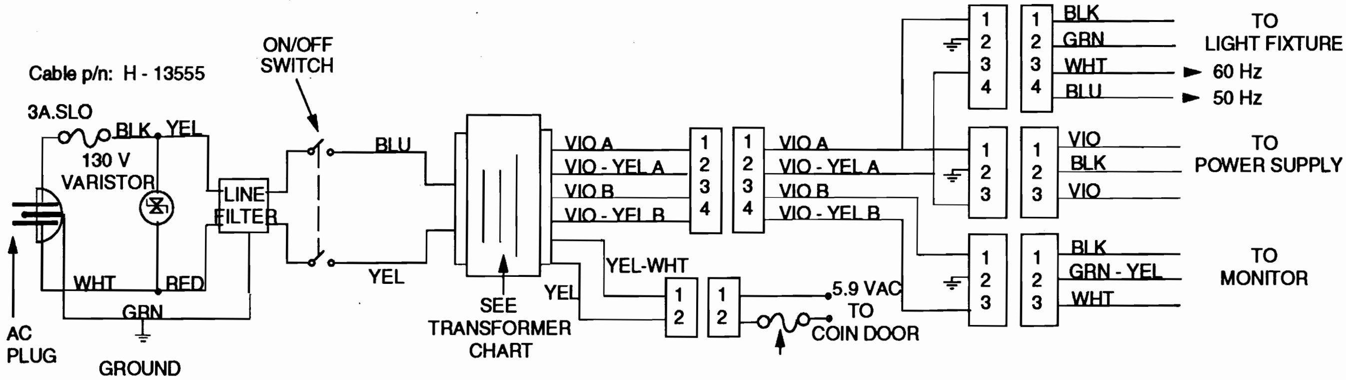
FUNCTION	WIRE COLOR	PIN	PIN	WIRE COLOR	FUNCTION
Ground	Blk	1	A	Blk	Ground
Ground	Grn-Brn	2	B	Blk	Ground
+5 Volts DC	Gry	3	C	Gry	+5 Volts DC
+5 Volts DC	Gry	4	D	Gry	+5 Volts DC
-5 Volts DC	Gry-Grn	5	E	Gry-Grn	-5 Volts DC
+12 Volts DC	Gry-Yel	6	F	Gry-Yel	+12 Volts DC
	Key	7	H	Key	
Counter 1 *	Wht-Orn	8	J	Wht-Grn	Counter 2 *
	NC	9	K	NC	
Speaker (+)	Red-Vio	10	L	Grn-Vio	Speaker (-)
	NC	11	M	NC	
Video Red	Red	12	N	Grn	Video Grn
Video Blue	Brn	13	P	Wht	Video Sync
Video Grd	Shield	14	R	Wht-Red	Service Credit *
Test *	Grn	15	S	Wht-Vio	Slam Tilt *
1 Coin	Wht-Blu	16	T	Yel-Wht	2 Coin
1 Start	Yel-Grn	17	U	Yel-Blu	2 Start
1 Up	Org-Blk	18	V	Yel-Blk	2 Up
1 Down	Org-Brn	19	W	Yel-Brn	2 Down
1 Left	Org-Red	20	X	Yel-Red	2 Left
1 Right	Org	21	Y	Yel-Org	2 Right
1 Action	Org-Yel	22	Z	Yel-Vio	2 Action
NC	Org-Grn	23	a	Yel-Gry	NC
NC	Org-Blu	24	b	Vio-Blk	NC
NC	Org-Vio	25	c	Vio-Brn	NC
NC	Org-Gry	26	d	Vio-Red	NC
Ground	NC	27	e	NC	Ground
Ground	Blk	28	f	Blk	Ground

* Optional function- Game will operate without these.

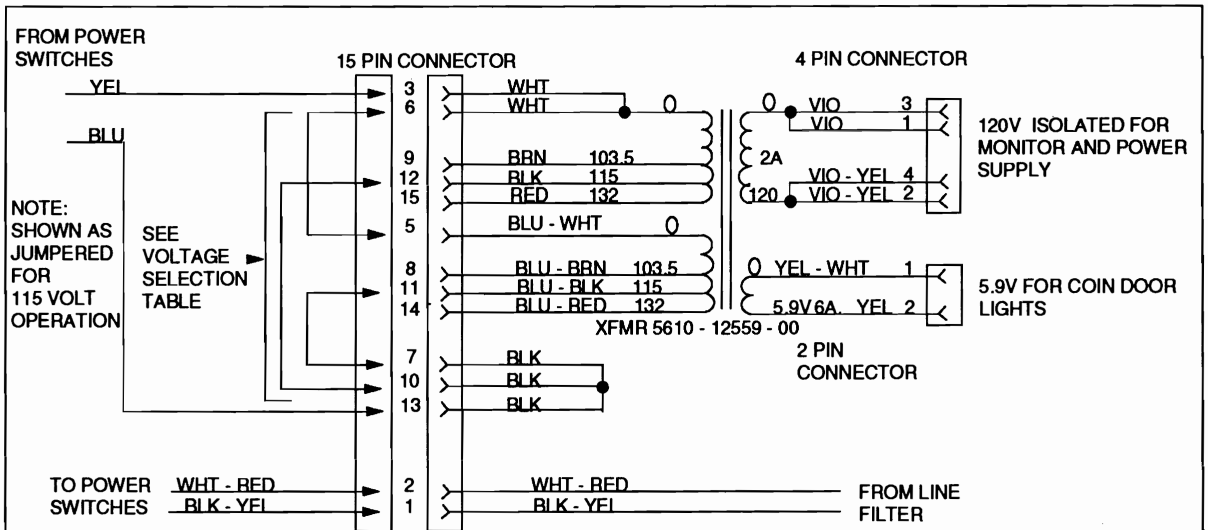
HIGH IMPACT FOOTBALL CABINET WIRING



HIGH IMPACT FOOTBALL POWER WIRING DIAGRAM



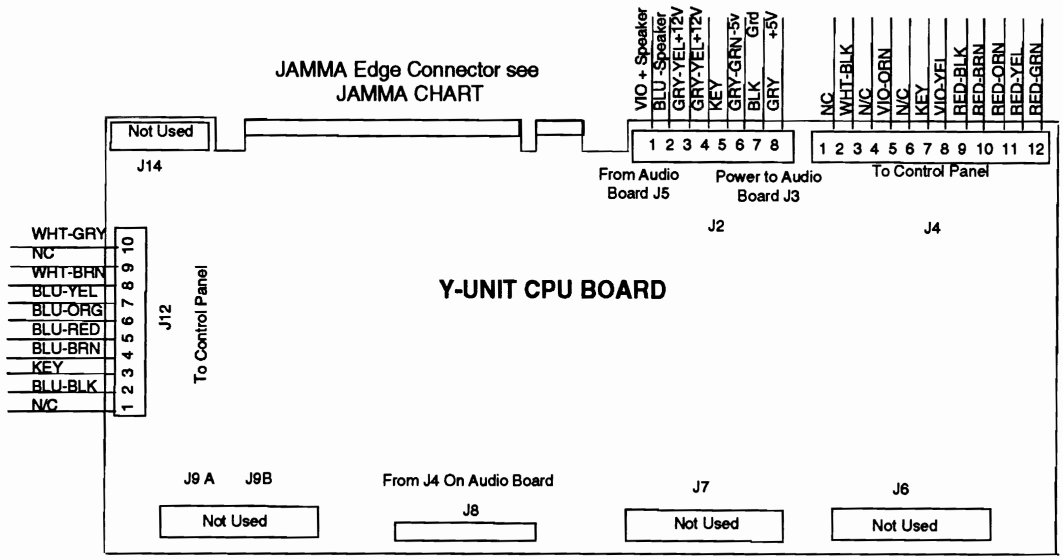
TRANSFORMER CHART

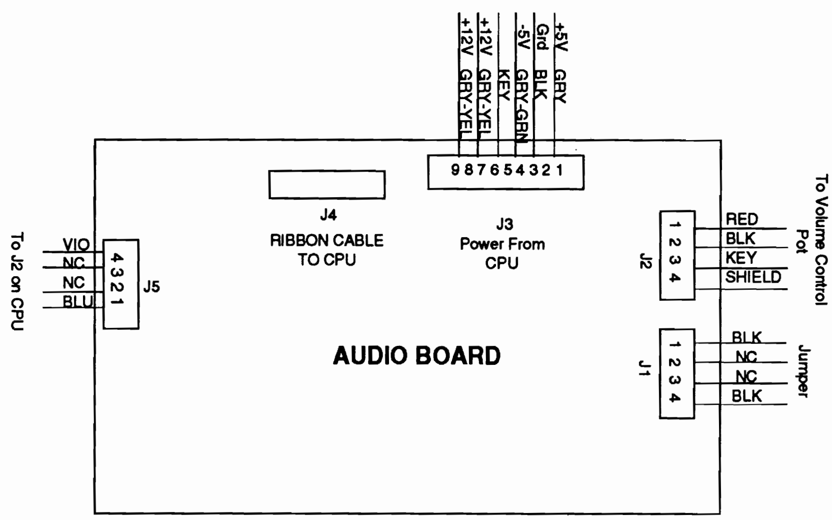


Voltage Selection Table

VOLTAGE	JUMPER PINS
103.5	5 - 6, 7 -8, 10 - 9
115	5 - 6, 7 - 11, 10 - 12
132	5 - 6, 7 - 14, 10 - 15
207	5 - 9, 10 - 8
218.5	5 - 9, 10 - 11
230	5 -12, 10 -11
247	5 - 12, 10 -14

HIGH IMPACT FOOTBALL INTERBOARD WIRING





NOTES:

NOTES:

WARNINGS & NOTICES

Warning

USE OF NON-WILLIAMS PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY WILLIAMS AUTHORIZED PARTS.

* For safety and reliability, substitute parts and modifications are not recommended.
* Substitute parts or modifications may void FCC type acceptance.
* This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under Federal law. This also applies to WILLIAMS logos, designs, publications and assemblies. Moreover, facsimiles of WILLIAMS equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with WILLIAMS components.

Warning

This equipment generates, uses and can emit radio frequency energy and, if not installed properly and used according to the directions in this manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of part 15 of FCC rules which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to radio communications, in which the user, at his or her own expense, will be required to take whatever measures may be needed to correct the interference.

Warning

Prevent shock hazard and assure proper game operation. Only plug this game into a properly grounded outlet. Do not use a cheater plug to defeat the power cord's grounding pin. Do not cut off the ground pin.

Notice

When Williams Electronics ships a game, it is in compliance with FCC regulations. Your sticker is proof. If the sticker is missing or damaged, legal repercussions to the owner or distributor of the game may result. If your game does not contain an FCC sticker, call Williams Electronics immediately.

Notice

WILLIAMS ELECTRONICS GAMES, INC.
3401 N. CALIFORNIA AVE.
CHICAGO, IL 60618

FOR SERVICE:
CALL YOUR AUTHORIZED WILLIAMS DISTRIBUTOR.